HISTORY OF THE DEPARTMENT OF MATHEMATICS

BRIGHAM YOUNG UNIVERSITY

1875–2012

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Foreword

In August 2012, the leadership of the Department of Mathematics of Brigham Young University requested the authors to compose a history of the department. The history that we had all heard was that the department had come into being in 1954, formed from the Physics Department, and with a physicist as the first chairman. This turned out to be partially true, in that the Department of Mathematics had been chaired by physicists until 1958, but it was referred to in the University Catalog as a department as early as 1904 and the first chairman was appointed in 1906.

The authors were also part of the history of the department as professors of mathematics:

Gurcharan S. Gill 1960–1999
Lynn E. Garner 1963–2007
Jan E. Wynn 1966–2000

Dr. Gill (1956–1958) and Dr. Garner (1960–1962) were also students in the department and hold B. S. degrees in Mathematics from BYU.

We decided to address the history of the department by dividing it into three eras of quite different characteristics.

The first era (1875–1978): Early development of the department as an entity, focusing on rapid growth during the administration of Kenneth L. Hillam as chairman.

The second era (1978–1990): Efforts to bring the department in line with national standards in the mathematics community and to establish research capabilities, during the administration of Peter L. Crawley as chairman.

The third era (1990–2012): Struggles to coordinate goals of the department and aims of the university, and individual achievements that helped the department move toward national recognition.

Primary compiler of the first era was Dr. Garner, of the second, Drs. Garner and Wynn, and of the third, Dr. Gill. We also asked Dr. Jaqueline Taylor Voyles and Jackie Robertson to contribute to the history of the Math Lab. Dr. Garner has served as final editor and any flaws in the editing are his responsibility.

Primary sources for the information include BYU publications, such as catalogs and commencement programs, college and department annual reports, and centennial histories of BYU, of the College of Physical and Engineering Sciences, and of the Department of Mathematics. Some of the photographs come from the BYU Archives. We thank the members of the department, including several present and past faculty members, and particularly Lonette Stoddard, for assistance in gathering information for this work and for technical typing.
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Mathematics at the University

The prominence of mathematics in education has been unquestioned in western civilization since the beginning. Numbers and counting have been known since the days of Adam (see Moses 6:5–6, 10, etc.). We have record of mathematics being developed for utilitarian purposes by the Babylonians, Egyptians, and Mayans, and for its own sake by the Greeks. The “oldest recorded entrance requirement of a college” reportedly hung over the door of Plato’s Academy (c. 375 BC), saying, “Let no one ignorant of geometry enter my doors” [Smith].

The mathematics of the Greeks was mostly lost to Western Europe during the dark ages. The new Hindu-Arabic numeration system made its way into Europe in the early 13th century and European universities founded in the 13th and 14th centuries included mathematics (arithmetic and geometry) as a basic topic required of all students. After the fall of Constantinople in 1453, the learning of the Greeks again became available, sparking the Renaissance and the corresponding surge in the development of mathematics, leading to the creation of calculus in the 17th century. Since that time, mathematics has continued to grow exponentially; every time a question about mathematics is answered, two or three more questions arise! Mathematics is often called “the language of science” and has also been the historical basis of many other disciplines: accounting, economics, physics and the natural sciences, statistics, computer science, and mathematics education. Mathematics is increasingly used as a tool in many other disciplines.

There has never been a question as to whether mathematics would be included in the curriculum at Brigham Young Academy/University. The charge of Brigham Young to Karl G. Maeser that, “neither the alphabet nor the multiplication tables were to be taught without the Spirit of God,” [Maeser] reflected the assumption that mathematics would be included. Mathematics has always been regarded as a subject worthy of study on its own, just for the development of one’s mental powers. It is the usefulness of mathematics that has resulted in high enrollments in mathematics courses through the years. In fact, mathematical “service courses” have been developed that cater to specific needs in such areas as education, biology, business, science, and engineering.

We see the development of the study of mathematics at BYU from its early position as purely utilitarian to its present position as a discipline with many facets, addressing many different uses and interests, and with influence far beyond the campus. The growth of the department has not been without struggle on several fronts, the most important of which was to balance the demands of teaching, research, and teacher training, in the context of rapid growth, with the goals of the university, the expectations of the discipline, and the capabilities of the faculty.
It is helpful to keep in mind that when Brigham Young Academy began operation, it was open to students of all ages. Eventually the academy was separated into elementary, secondary, commercial, and college portions. Since the early emphasis of the college portion was to train teachers, the elementary and secondary “training” schools were maintained to give training to the student teachers. In the early years, a member of the faculty might well have teaching assignments in any or all divisions of the academy. The training schools persisted until May of 1967.

Mathematics courses have been present since the beginning of Brigham Young Academy. The first circular (catalog), published in 1878, lists Algebra, Geometry, Surveying, and Drafting as “Polytechnical” courses, indicating that these topics were used in many disciplines. The courses Algebra, Geometry, and Advanced Arithmetic were listed in the 1879 circular. The 1885 circular lists

<table>
<thead>
<tr>
<th>Bookkeeping</th>
<th>Geometry and Trigonometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Arithmetic</td>
<td>Surveying</td>
</tr>
<tr>
<td>Higher Arithmetic</td>
<td>Analytic Geometry and Calculus</td>
</tr>
<tr>
<td>Algebra</td>
<td></td>
</tr>
</tbody>
</table>

as the mathematics courses. All of these, save Calculus, have been regarded as high school courses most of the time. It was not until 1902 that the Collegiate Department, having been established in 1896, was finally recognized as the location of the college-level courses and set apart from the elementary, secondary, and commercial training efforts of the Academy.

Instructors in the mathematics courses in the Academy included

- John E. Booth
- Wilford McKendrick
- Joseph L. Horne
- Joseph M. Tanner
- Ephraim Gowans
- William F. Ward
- Benjamin Cluff, Jr.
- Ernest D. Partridge
- Clarence Jarvis

(see Faculty Profiles in the appendix). Principal Karl G. Maeser instructed the teachers in the academy at the beginning of each school year. James E. Talmage, acting as secretary of the Academy, recorded the following instructions from Principal Maeser during a faculty meeting in August 1884, regarding arithmetic:

Three steps are always necessary, first, requiring the students to solve the problems in the book, second, problems composed by the teacher, and third, problems composed by themselves. The deficient students constitute the test of a teacher’s efficiency. The plan was given to each teacher for his term’s work and he was required to divide it into nine parts, one for each week, and submit it to the principal. Every Wednesday must be devoted to mental exercises. Teachers should be eminently practical, teaching nothing for which students can find no practical use [Hales, p. 17].
The move of Brigham Young Academy to the new Education Building at 550 North University Avenue on 4 Jan 1892 coincided with the installation of Benjamin Cluff, Jr. as principal and then (in 1894) president of the academy. President Cluff was a graduate of BYA and had been one of the teachers of mathematics in the years prior to 1886, when he went to the University of Michigan to obtain a baccalaureate degree. He returned in 1890 imbued with an appreciation of what a university could be in terms of scholarship, expectations, and impact on the community and the church. During his eleven years of leadership, the financial basis of the academy was secured, the Collegiate Department was separated from the high school, and the academy became Brigham Young University in 1903. The new building and the new principal sparked much enthusiasm; the student body increased from 394 to 823 in one year and the faculty increased from 16 to 28 in the next four years.

Typical of President Cluff’s concern for teaching effectiveness is the following excerpt from a letter written to Acting Principal George H. Brimhall in 1893:

> Especially let me ask that you see to the mathematics, algebra and geometry. In algebra the theorems and the most important formulae should be memorized by the pupils. Also drill on devices in performing all the fundamental operations should be continued until the pupils reach a good degree of perfection. In geometry the pupils should be able to state the propositions, draw the figure and go through the demonstrations without looking at the book. And it would not be a bad exercise at times to require them to turn their backs to the board and still go through the demonstration [Hales, p. 32].

President Cluff resigned his position to pursue other interests at the end of 1903. During his tenure, he did much to strengthen the level of scholarship and the accreditation of BYA with other universities. The student body, not counting the students in the Elementary Training School, grew from 386 in 1892 to 825 in 1903. The library grew from 1053 volumes and 596 pamphlets (journals and magazines) in 1892 to 5432 volumes and 6023 pamphlets in 1903. In 1892, the faculty consisted of 28 members, with one doctor’s degree, three master’s degrees, and eleven bachelor’s degrees among them; in 1903, there were 57 faculty, including two doctors, one masters, and fourteen bachelors. Under his encouragement, many more students pursued degrees at eastern and western universities. Finally, the distinction was made between high school and college level courses.

The Brigham Young Academy catalog of 1901–1902 lists an impressive array of mathematics courses. There is no assurance that they were all taught, as there were almost certainly too few students to carry the courses and too few teachers to cover them. The courses were designated as:

- a. Normal Arithmetic
- b., c. Elementary Algebra
- d. Advanced Algebra
- e. Plane Geometry
- f. Solid Geometry
- 1. Trigonometry
- 2. Analytic Geometry
- 3. Differential Calculus
- 4. Integral Calculus
- 5. Quaternions
- 6. Theory of Equations
- 7. Differential Equations
- 8. Solid Analytic Geometry
- 9. Projective Geometry
10. Advanced Conic Sections
11. Advanced Differential Calculus
12. Advanced Integral Calculus
13. Binary Quantics
14. Theory of Functions
15. Theory of Numbers

These were semester-long courses, with Elementary Algebra covering two semesters. It appears from the numbering scheme that the first six courses were high school level and the rest, college level. In every case a textbook was named and either Professor Partridge or Professor Ward was assigned in the course description. A note following the listing said, “Applicants for Mathematics 5 to 15 inclusive may arrange time with instructor.” Many of these courses disappeared from the catalogs after a few years; for example, Quaternions was listed only from 1901 to 1910 and Binary Quantics (polynomials in two variables), only from 1901 to 1904. Some of the courses, such as Theory of Functions and Theory of Numbers, were re-introduced years later, in reorganized form.

**Mathematics at Brigham Young University: 1903–1954**

With the appointment of George H. Brimhall as president of BYU early in 1904, emphasis was placed on the four-year college program immediately. The department organization and courses of study were constantly changing as new faculty members were employed and student enrollments increased. While mathematics courses were listed together in the catalogs from earlier times, they were first listed as being in the Department of Mathematics in the 1904–1905 catalog; the listing has been so labeled ever since, except for the years 1919-1921 and 1951-1953 when they were listed as being in the Department of Physics and Mathematics.

The first chair of the Department of Mathematics was **Ernest DeAlton Partridge**, appointed in 1906. After graduating from BYA, he graduated as valedictorian of his class at Michigan State in 1898. He devoted his life to BYU and taught nearly all of the drafting and surveying courses for years; from 1901 to 1912, he also taught mathematics. A prominent legacy of Professor Partridge is the block “Y” on the mountain. It was laid out in his drafting classes and he supervised the surveying and construction, with students Harvey Fletcher, Wayne B. Hales, Clarence Jacobs, Elmer Jacobs (a future Provo City engineer) and others assisting. Professor Hales recounted positioning the surveyor’s transit on the roof of the Education Building to lay out the “Y” so that it would have the proper perspective from downtown Provo. Professor Partridge also surveyed trails to the “Y”, to Maple Flats, and to Mount Timpanogos. [Olpin, p. 4]

Professor Partridge served as chair for one year, followed by William F. Ward, who served as chair for five years altogether, Chester Snow, one year, and Andrew S. Gibbons, one year.
Harvey Fletcher served as chair of the Department of Mathematics for two years, 1914–1916. He had graduated from BYU in 1907 and obtained his PhD at the University of Chicago in 1911. There he had worked with Robert Millikan in measuring the charge of an electron. He returned to BYU, teaching Mathematics and Physics, the only PhD on the BYU faculty at the time. In 1916 he accepted a position with Western Electric in New York, and soon became Director of Physical Research at Bell Labs. After an illustrious career there, including the winning of some 20 patents, he was called back to BYU by President Wilkinson in 1951 as Director of Research. In 1982, his family would establish a general scholarship fund in his name for students at BYU.

Carl F. Eyring served as chair of the Department of Mathematics for 31 years altogether, between 1910 and 1951. For 30 years, he was also chair of the Physics Department and for 26 years he was also dean of the College of Arts and Sciences. He had graduated from BYU in 1912, received an MA degree from Wisconsin in 1915, and took leave from BYU to earn his PhD from CalTech in 1923. The Eyring Science Center was named in his honor in 1950.

All of these professors had training in physics and the sciences, so taught mathematics on the side, as it were, even though they were often listed in the catalogs as professors of mathematics or of physics and mathematics. They were also needed to teach at the high school level in the early years. According to the catalogs, the mathematics and physics departments were formally combined for two two-year periods, not finally separated until 1953. A physicist of national prominence in 1955 attributed the strength of Utah in the discipline of physics to the influence of Dr. Harvey Fletcher and his protégés, including Vern O. Knudsen, Carl F. Eyring, and A. Ray Olpin [Hales, p. 55], all of which were prominent in university education. The first faculty member who had a PhD in mathematics was Harvey J. Fletcher, who joined the faculty in 1953.

The mathematics and physical sciences courses were taught in the Education Building during the Brimhall years. Chemistry was taught on the first and second floors, physics, on the first floor, geology, on the fourth floor, and mathematics, “wherever a room could be found” [Hales, p. 55]. This would be the pattern for the next half century, possibly because mathematics would not demonstrate a need for laboratory space for many years.

In 1920, with the transition to a quarter calendar, the requirements for graduation with a Bachelor’s degree were specified. Both B. A. and B. S. degrees required 183 quarter hours of work. Two courses in English and one in Physical Education were specified, and for the B. A., two years’ study (or equivalent) of an approved foreign language. Both degrees called for
30 hours of a major subject and 20 hours of an allied minor subject. No credit for elementary courses was allowed during the senior year.

The B. S. degree in Mathematics required at least the five courses: Plane and Spherical Trigonometry (5 hrs.), College Algebra (5 hrs.), Analytic Geometry (5 hrs.), Differential and Integral Calculus (5 hrs.), and Differential Equations (3 hrs.). The only other courses in Mathematics listed in the catalog were Definite Integrals (4 hrs.) and Analytical Mechanics (4 hrs.). It thus appears that a math major in those years would have to take all the courses offered! But as always happens, changes took place very soon.

During the 1920s, the calculus course expanded to three quarters and the differential equations course expanded to two quarters; the trigonometry course became Plane Trigonometry. By 1923, the courses were designated as lower division or upper division, with everything beyond Analytic Geometry being upper division. By 1925, the courses Shop Mathematics, Graphical and Statistical Methods, and Mathematical Theory of Investments were added as lower division courses. In 1926, Vector Analysis was added as a graduate course. This offering was basically unchanged for a decade, though some experimentation with different forms of the lower division courses took place.

In the 1930s, Advanced Calculus was added as an upper division course and as a full year sequence at the graduate level. Dynamics was added as an upper division course. A graduate-level Differential Equations course of one or two quarters was added, and also Readings in Mathematics and Thesis courses were introduced, which remain to this day. A lower division Commercial Algebra course was listed in 1934 and persisted for a decade. During 1943-1945, a course in Solid and Spherical Trigonometry was taught in support of the war effort.

World Wars I and II had a slowing effect on the growth of the university, both in students and in faculty. Many faculty were called into government service. At the close of WWII, the student population exploded and beginning in 1951, a period of remarkable expansion of the university took place under the leadership of President Ernest L. Wilkinson. Remember that the number of students in the elementary and secondary training schools far outnumbered the college students in the early days. The following table counts only students in the College Department and its successors.

<table>
<thead>
<tr>
<th>Year</th>
<th>Students Enrolled</th>
<th>Faculty Employed</th>
<th>Books in Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>1903</td>
<td>63</td>
<td>18</td>
<td>6,058</td>
</tr>
<tr>
<td>1921</td>
<td>438</td>
<td>78</td>
<td>20,000</td>
</tr>
<tr>
<td>1945</td>
<td>1508</td>
<td>143</td>
<td>138,500</td>
</tr>
<tr>
<td>1946</td>
<td>3446</td>
<td>145</td>
<td>138,500</td>
</tr>
<tr>
<td>1949</td>
<td>5780</td>
<td>211</td>
<td>145,000</td>
</tr>
<tr>
<td>1950</td>
<td>5429</td>
<td>231</td>
<td>165,000</td>
</tr>
</tbody>
</table>

Franklin S. Harris had become president of the university in 1921. He presided over steady growth during his 24 years, overseeing the construction of the Heber J. Grant Library, two more floors of the Brimhall Building, and the Joseph Smith Building, as well as Allen Hall, Amanda Knight Hall, and “Y” Stadium. His efforts at academic realignment brought BYU’s
organization more in line with what was typical at other institutions of higher learning across the country. He organized the Graduate School, the Research Division, and the Extension Division upon taking office in 1921.

President Harris left BYU to become president of Utah State University in 1945 and was succeeded by President Howard S. McDonald. President McDonald met the post-war growth challenges that all universities faced with vigor and vision. The student body more than doubled during his first year, requiring additional housing, counseling, and faculty. Surplus government buildings (“barracks”) were used to good advantage in many settings, from faculty offices to student housing to service buildings (such as bookstore, health center, classrooms, warehouse, and dairy), being replaced in time with permanent buildings. He worked on expanding the faculty, strengthening the graduate school, and organizing student advisement. Construction of the Eyring Science Center was begun just before the end of his service.

Christen Jensen served as Acting President from late 1949 to early 1951. He organized and presided over the Diamond Jubilee Celebration on Founders Day, 19 October 1950, to which hundreds of special guests were invited. During this celebration, the Eyring Science Center was dedicated and the BYU Chapter of Sigma Xi, the National Research Society, was inaugurated. Sigma Xi had been a club on campus since 1935, formed by faculty members who had been initiated into Sigma Xi at other graduate institutions.

Ernest L. Wilkinson became president of BYU in February of 1951. One of his early actions was to hire Harvey Fletcher as Director of Research; he charged Dr. Fletcher to create a Department of Engineering Science, which began functioning in the fall of 1952. This action led to a reorganization of the colleges in 1954.

**The Expansion Years: 1954–1978**

The administration of President Ernest L. Wilkinson was truly a time of remarkable expansion of the university. Consider the following benchmarks of growth:

<table>
<thead>
<tr>
<th></th>
<th>From (1951)</th>
<th>To (1971)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus Acreage</td>
<td>200</td>
<td>535</td>
</tr>
<tr>
<td>Number of Buildings</td>
<td>11 + 8 temporary</td>
<td>347</td>
</tr>
<tr>
<td>Library Volumes</td>
<td>165,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Research Funding</td>
<td>$29,811</td>
<td>$2,466,112</td>
</tr>
<tr>
<td>Colleges and Divisions</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Faculty (% PhD)</td>
<td>237 (26%)</td>
<td>1,015 (54%)</td>
</tr>
<tr>
<td>Student Enrollment</td>
<td>5,957</td>
<td>28,270</td>
</tr>
<tr>
<td>Number of Graduates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
<td>740</td>
<td>4,130</td>
</tr>
<tr>
<td>Masters</td>
<td>90</td>
<td>700</td>
</tr>
<tr>
<td>Doctors</td>
<td>0</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
<td>4,910</td>
</tr>
</tbody>
</table>
Organization

In 1954, the College of Arts and Sciences was split and the Department of Mathematics became part of the College of Physical and Engineering Sciences, of which Harvey Fletcher was the first dean. He served there for four years, after which Armin J. Hill became dean, where he served for 15 years.

The chairman of the Department of Mathematics was Milton Marshall; he served as chair for nine years altogether, having filled in for Carl F. Eyring in 1929–1931 and 1938 before becoming the chair in 1951. He had entered BYU in 1914 and soon attracted attention by his competence in mathematics. When he graduated in 1918, he was hired to teach mathematics and physics. He earned a PhD in physics from the University of Chicago in 1924, studying under Albert Michaelson of Michaelson-Morley fame. He returned to BYU and spent the rest of his life as a professor. During part of World War II, he was the only science and mathematics professor on campus and taught a 26 quarter-hour load. He often spent evenings teaching night classes or building laboratory equipment for teaching physics. He received the Karl G. Maeser Distinguished Teaching Award in 1961, just three months before he died of a heart attack at the age of 66.

Harvey J. Fletcher, son of Harvey Fletcher, was appointed chairman of the Department of Mathematics in 1958. He had obtained a BS degree in 1944 from MIT, an MS degree from CalTech in 1948, and a PhD from Utah in 1953. His specialty was applied mathematics. He joined the BYU faculty in 1953, the first member of the Math faculty with a PhD. Only when he became chair was the administration of mathematics fully separated from that of physics. Here is the new beginning of the department as Dr. Fletcher remembered it:

Off the Cuff Comments on the Starting of the Math Department at BYU
By Harvey J. Fletcher, Jan 2, 2012

In 1953, I married Deah Tonks in the Idaho Falls Temple. I finished my work for a PhD in mathematics at the University of Utah. I was the first person to get a PhD in mathematics in the state of Utah. I was offered a teaching position in the Physics Department at BYU. The leaders in the department were Milton Marshall, Wayne Hales, and John Gardner. Others that I remember were Ed Dean and Jack Eastman. None of them had a PhD in mathematics but I think Milton Marshall had a lower degree. I taught Mathematical Physics as well as basic math courses.

I mentioned to the Chairman of the Physics Department that we should have a Mathematics Department at BYU. The reply that I got was that a Mathematics Department is not needed at BYU, because the Physics Department has been doing well in teaching all of the basic
mathematics needed for Physics and Engineers. I then went to the Dean of the College of Physical Sciences who was a geologist, named Dr. George Hansen, I believe. He gave the same response as the Physics Department. The next year or so, Dr. Hansen was replaced by a retired executive from Bell Telephone Laboratories named Harvey Fletcher. I approached him and said, "Dad, we need a Mathematics Department at BYU." In a year or so, BYU had a mathematics department.

Actually my role was not that big. Dad had hired many scientists at Bell Labs and he knew the importance of mathematics in the development of science. He went through the necessary steps to start a new department. At the same time he started with President Ernest Wilkinson to get the funding for not only mathematics but also Electrical Engineering, Chemical Engineering, Mechanical Engineering and Civil Engineering. He had experience in hiring top scientists for Bell Labs and had the drive to get these departments started. At first President Wilkinson was rebuffed by the Board of Trustees of BYU. The argument was that BYU should not be a specialist school but a good undergraduate school with a spiritual environment. However, Dad persisted and got approval for a mathematics department and one engineering department, which would have a good mathematical foundation. He later got approval for the four engineering departments that he had envisioned as a starting point for an Engineering College.

Dad said that he taught mathematics in about 1907 [the year of his graduation from BYU] and the departments of Physics and Mathematics were separate. It was his idea to fuse them into one department and call the new department the Physics Department. This remained fused [in practical terms] until Dad came to BYU after his retirement at Bell Labs. Then he separated the Physics and Mathematics Departments. Dr. Milton Marshall, a veteran teacher of Mathematics who had a degree in Mathematics was chosen as the first chairman.

I was the only PhD in the Department and we started looking for Mormon mathematicians throughout the United States. Dad told me they wrote to all the stake presidents in the United States to find out if there were any PhD mathematicians. He got one reply from the University of Illinois. This person would not come to BYU. In order to fill all the classes with mathematicians we needed to find help elsewhere. We borrowed Ed Dean from the Physics Department who would help with the computer science that we were teaching. I was teaching the Mathematical Statistics. We hired Floyd Haupt from a Junior College in Utah. We hired Lloyd Olpin from a Junior College in Arizona. We transferred an engineer from the Engineering Department. We had student assistants.

However, nobody was doing any mathematical research. Howard Nielsen left teaching in our department and started a Department of Statistics. Ed Dean and Willard Gardner left teaching in our department and started a Computer Science Department. Soon we realized that we would have to get Mormons that were PhD students in mathematics. We hired Don Robinson, Gurcharan Gill, Lawrence Fearnley, Gerald Armstrong, and Ron Jameson. These were all good students and good teachers and all of them received their PhD’s.

I started teaching all of the upper division and graduate courses as well as a computer course and a mathematical theory of statistics. When Statistics and Computer Science split off and the new research faculty were more qualified to teach graduate courses, I taught Engineering Mathematics and Applied Partial Differential Equations. When I first came I had an office in the temporary Army barracks on BYU campus. Later I had an office in the reporters building on the old football field. They called it the Stadium Office Building. I think my office number was SOB #13. Because of the abbreviation they changed the name to the Faculty Office Building. Later the school built a mathematics building named the Talmage Building.

Two of the first students I supervised on a Master’s Degree in Mathematics were Kirk Tolman and Ken Larsen. Both went on to get PhD’s and returned to the faculty at BYU. A
third student that I helped with his master’s degree was Kent Harrison who returned to BYU with a PhD in Physics. I was surprised to see that some of the undergraduates I taught became department heads and deans at BYU. I remember Doug Smoot, dean of Engineering. One class that I taught had 3 students. One was extra smart. His name was Mark Nelson. I think he received a PhD from Harvard and came back and taught Physics at BYU.

One story about Milton Marshall. He got angry with the students for making such foolish mistakes and said, "You are driving me to drink". The next day the students chipped in and put a bottle of whiskey on his desk. He had a hearty laugh. Carl Eyring was my uncle and was dean of the college when I took his class in College Algebra in 1940. He was evaluating determinants by multiplying numbers on slanty lines. This was OK for a 3x3 determinant but not for 4x4. He had been teaching this for many years. When I pointed out to him that he was wrong, my ego went sky high. I knew something the teacher didn’t know. I got an A from that class, partly because I had the equivalent class in High School.

As the department grew, so did the quality of the courses and the quality of research. It was very gratifying to me. I had a lot of fun teaching and loved the students.

Kenneth L. Hillam became chair of the Department of Mathematics in 1963. He had received BS and MS degrees from the University of Utah in 1949 and 1956 and the PhD degree from the University of Colorado in 1962; his specialty was analysis. He had joined the BYU faculty in 1958. He served as chair of the department for fifteen years, conducting the hiring of more new permanent faculty members than any other chair. As the department and student body grew, an assistant chairman was soon added to handle the growing administrative load. Here are those who served as department administrators during the Wilkinson years:

<table>
<thead>
<tr>
<th>Chairman</th>
<th>Assistant Chairman</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951–1958</td>
<td>none</td>
</tr>
<tr>
<td>1958–1961</td>
<td>none</td>
</tr>
<tr>
<td>1962–1963</td>
<td>Hal G. Moore</td>
</tr>
<tr>
<td></td>
<td>Ronald D. Jamison (1964–1967)</td>
</tr>
<tr>
<td></td>
<td>Jan E. Wynn (1967–1969)</td>
</tr>
<tr>
<td></td>
<td>Burton C. Gee (1969–1972)</td>
</tr>
</tbody>
</table>

During the summer of 1975, Dr. Hillam went on professional development leave, and Dr. Lynn Garner served as acting chairman.

A department requires a full-time secretary in order to function properly. Maxine Pool was the first full-time secretary, serving both the Physics and Mathematics Departments. Nancy Sego became the full-time Mathematics secretary in 1962. Shirley Trefzger was a full-time secretary during the spring and summer of 1969, and Linda Ivie became a full-time secretary in the fall of 1969. Pamela Wheelwright served as department secretary from 1976 to 1978,
Diane Kunkel, from 1978 to 1980, and DeeAnn Hatch, from 1978 to 1982. Many students have served as part-time secretaries over the years.

In the early 1970s, an executive assistant to the chairman was hired to handle accounting and financial matters. Edah Shuttleworth was executive assistant from 1973 to 1977, when Leri Dawn Smith was hired. Leri served until her retirement in 2007.

In 1971, President Wilkinson resigned and Dallin H. Oaks was appointed to replace him. Numerous changes came with the change in leadership, including a new calendar that more fully utilized the burgeoning campus. The semesters were moved forward so that fall semester ended before Christmas and winter semester ended in April; the summer school was split into spring and summer terms of half a semester each, allowing the equivalent of three semesters of classwork in one year. Faculty members usually taught during the two semesters and were allowed to teach during one of the terms for extra compensation.

The Engineering Sciences Department had been split into four departments, indicating that an organizational realignment was in order. In 1972, the College of Physical and Engineering Sciences was split into the College of Engineering and Technology, of which Armin J. Hill remained the dean, and the College of Physical and Mathematical Sciences, of which Jae R. Ballif became the dean. The departments in the CPMS were Chemistry, Computer Science, Geology, Mathematics, Physics, and Statistics.

**Faculty**

The 1954–1955 Catalog lists as faculty of the Department of Mathematics, the following:

- **Professors**: Marshall (Chairman), W. Hales
- **Associate Professors**: Eastmond, Gardner
- **Assistant Professors**: R. Hales, Miller
- **Instructors**: Dean, Fletcher, Geertsen

Of these, only Edwin Dean and Harvey J. Fletcher were listed as assigned to Mathematics; the rest were assigned to Physics, except that Wayne B. Hales and Martin L. Miller were assigned to Physics and Mathematics. The Department of Mathematics still needed much help from the Physics faculty to cover its courses, but that was soon to change.

The university and college administrators were anxious to meet the needs of a growing student population with qualified (i.e., PhD-holding) faculty members. The problem was that there were too few LDS mathematicians with PhDs to meet the need. The same problem existed in many other disciplines, so the university put programs in place to assist beginning faculty members to obtain the advanced degrees. One such program was referred to as the “accelerated sabbatical” program, whereby a faculty member who had taught for three years could take a year’s leave with half pay while working on an advanced degree. Several members of the math department took advantage of this program. The result was that the percentage of faculty at the university with PhDs grew from 26% to 54% during the Wilkinson era.
Expansion of the Department of Mathematics was dramatic. Following is a list of the “permanent” faculty members with training in mathematics that were added to the department during the Wilkinson years and shortly following [Olpin, p. 37]:

1953  Harvey J. Fletcher
1954  Floyd E. Haupt
1955  J. Lloyd Olpin
1956  Donald W. Robinson
1957  Lawrence Fearnley, Kenneth L. Hillam, Harry E. Wickes
1960  Kenneth M. Larsen, Burton C. Gee, Gurcharan S. Gill
1961  John C. Higgins, Hal G. Moore
1962  Paul Yearout, Louis J. Chatterley
1964  Robert C. Burton
1965  R. Vencil Skarda, L. Kirk Tolman
1966  Jan E. Wynn
1967  Royal C. Hurd, Richard A. Hansen
1968  Jack W. Lamoreaux, Leroy H. Walker
1969  Charles N. Walter, Donald R. Snow
1970  Gerald M. Armstrong
1971  Douglas M. Campbell, Helaman R. P. Ferguson, Peter L. Crawley
1974  Albert W. Pope
1978  Jaqueline Taylor-Ortega

This picture of some of the faculty was taken for the 1975 Banyan, the BYU yearbook. **Front row:** Ronald D. Jamison, Louis J. Chatterley, Jan E. Wynn, Lawrence Fearnley, Kenneth L. Hillam, Kenneth M. Larson, Donald R. Snow, Theodore A. Wight. **Back row:** Floyd E. Haupt, R. Vencil Skarda, Richard A. Hansen, Douglas M. Campbell, Helaman R. P. Ferguson, Burton C. Gee, Harry E. Wickes, Donald W. Robinson, John M. Peterson, Charles N. Walter, Royal Hurd

There were about eight additional “short-term” faculty members who taught in the department briefly but moved on to other interests. The department continued to borrow faculty from Physics or Chemistry to teach courses as needed from time to time.
Student Achievements

In a file in the Mathematics department office, labeled “Before 1978,” we found a chart, pencil on a quadrille page, labeled “Mathematics Degrees at BYU.” The chart was probably compiled by Harvey J. Fletcher in December of 1960. It contained the information in the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>1910</th>
<th>1911</th>
<th>1916</th>
<th>1917</th>
<th>1918</th>
<th>1922</th>
<th>1923</th>
<th>1925</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1926</td>
<td>1928</td>
<td>1929</td>
<td>1930</td>
<td>1931</td>
<td>1932</td>
<td>1934</td>
<td>1935</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1936</td>
<td>1937</td>
<td>1938</td>
<td>1939</td>
<td>1940</td>
<td>1941</td>
<td>1942</td>
<td>1944</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>14</td>
<td>11</td>
<td>19</td>
<td>13</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>6</td>
<td>(10)</td>
<td>(11)</td>
<td>(20)</td>
<td>(13)</td>
<td>(12)</td>
<td></td>
</tr>
</tbody>
</table>

The five-year totals were then sketched in a graph, showing an exponential growth curve, except for a decided dip during the years of World War II. Unfortunately, there was no other information given. Commencement programs of BYU did not list graduates by major (but only by college and degree) until 1954. The numbers in parentheses in the above table for 1949 and following are the numbers of graduates in the lists of known graduates in the appendix. Another similar piece of paper in the same file, dated Dec 1960, has a graph of degrees awarded from 1953 to 1960, differing slightly in some cases with the numbers in the above table.

This same piece of paper shows a graph labeled, “Math Major Enrollment BYU,” giving the following data:

<table>
<thead>
<tr>
<th>Year</th>
<th>Freshmen</th>
<th>Juniors</th>
<th>Graduates</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>W</td>
<td>S</td>
<td>A</td>
</tr>
<tr>
<td>57-8</td>
<td>13</td>
<td>15</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>58-9</td>
<td>23</td>
<td>20</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>59-0</td>
<td>36</td>
<td>36</td>
<td>29</td>
<td>18</td>
</tr>
</tbody>
</table>

If these numbers are accurate, they show that the numbers of math majors increased dramatically in the three years given, by 250%, 252%, and 197%, respectively, in autumn, winter, and summer enrollments.

Another paper in the “Before 1978” file, labeled “Mathematics Statistics” and probably compiled by Kenneth L. Hillam, contains the following information:
### Mathematics Statistics

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FTE* St.</td>
<td>510</td>
<td>483</td>
<td>464</td>
<td>512</td>
<td>679</td>
<td>715</td>
<td>937</td>
<td>958</td>
</tr>
<tr>
<td>Majors</td>
<td>97</td>
<td>132</td>
<td>155</td>
<td>173</td>
<td>217</td>
<td>255</td>
<td>284</td>
<td>322</td>
</tr>
<tr>
<td>FTE Fac.</td>
<td>14</td>
<td>14</td>
<td>15</td>
<td>17</td>
<td>24</td>
<td>25.75</td>
<td>25.5</td>
<td>26</td>
</tr>
<tr>
<td>Grad St.</td>
<td>12</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>20</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>BS Deg.</td>
<td>8</td>
<td>14</td>
<td>9</td>
<td>15</td>
<td>12</td>
<td>18</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>MS Deg.</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Budget</td>
<td>7200</td>
<td>7900</td>
<td>9230</td>
<td>10750</td>
<td>11400</td>
<td>13490</td>
<td>16815</td>
<td></td>
</tr>
<tr>
<td>F/S Ratio</td>
<td>1/37</td>
<td>1/34.5</td>
<td>1/31</td>
<td>1/30</td>
<td>1/28</td>
<td>1/27.5</td>
<td>1/36</td>
<td>1/37</td>
</tr>
<tr>
<td>Budget/S</td>
<td>14.12</td>
<td>16.36</td>
<td>19.89</td>
<td>21.00</td>
<td>16.79</td>
<td>18.87</td>
<td>17.95</td>
<td>17.08</td>
</tr>
</tbody>
</table>

*FTE means Full-Time Equivalent

The table below shows the numbers of known graduates by year up to 1979. The general increase in the numbers of graduates reflects both the natural growth of the student body and the growing strength of the Department of Mathematics.

#### Numbers of Graduates in Mathematics

<table>
<thead>
<tr>
<th>Year</th>
<th>BA</th>
<th>BS</th>
<th>MA</th>
<th>MS</th>
<th>Total</th>
<th>Year</th>
<th>BA</th>
<th>BS</th>
<th>MA</th>
<th>MS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>1966</td>
<td>3</td>
<td>31</td>
<td></td>
<td>8</td>
<td>43</td>
</tr>
<tr>
<td>1953</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td>12</td>
<td>1967</td>
<td>2</td>
<td>32</td>
<td></td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>1954</td>
<td>1</td>
<td>8</td>
<td></td>
<td></td>
<td>9</td>
<td>1968</td>
<td>40</td>
<td></td>
<td>1</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td>1955</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td>6</td>
<td>1969</td>
<td>12</td>
<td>30</td>
<td></td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>1956</td>
<td>8</td>
<td></td>
<td>2</td>
<td>10</td>
<td>10</td>
<td>1970</td>
<td></td>
<td>34</td>
<td></td>
<td>16</td>
<td>50</td>
</tr>
<tr>
<td>1957</td>
<td>3</td>
<td>7</td>
<td></td>
<td>11</td>
<td>11</td>
<td>1971</td>
<td>2</td>
<td>47</td>
<td></td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>1958</td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
<td>20</td>
<td>1972</td>
<td>12</td>
<td>11</td>
<td></td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td>1959</td>
<td>1</td>
<td>12</td>
<td></td>
<td></td>
<td>13</td>
<td>1973</td>
<td>15</td>
<td>14</td>
<td></td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>1960</td>
<td>2</td>
<td>9</td>
<td></td>
<td>12</td>
<td>12</td>
<td>1974</td>
<td>23</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>48</td>
</tr>
<tr>
<td>1961</td>
<td>2</td>
<td>13</td>
<td></td>
<td>21</td>
<td>21</td>
<td>1975</td>
<td>29</td>
<td>25</td>
<td>1</td>
<td>3</td>
<td>58</td>
</tr>
<tr>
<td>1962</td>
<td>6</td>
<td>8</td>
<td></td>
<td>17</td>
<td>17</td>
<td>1976</td>
<td>15</td>
<td>20</td>
<td>9</td>
<td>6</td>
<td>50</td>
</tr>
<tr>
<td>1963</td>
<td>3</td>
<td>19</td>
<td></td>
<td>26</td>
<td>26</td>
<td>1977</td>
<td>28</td>
<td>33</td>
<td>5</td>
<td>2</td>
<td>68</td>
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<tr>
<td>1964</td>
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<td>17</td>
<td>17</td>
<td>1978</td>
<td>10</td>
<td>24</td>
<td>4</td>
<td>1</td>
<td>39</td>
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<tr>
<td>1965</td>
<td>6</td>
<td>20</td>
<td></td>
<td>27</td>
<td>27</td>
<td>1979</td>
<td>9</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>35</td>
</tr>
</tbody>
</table>

The **Orson Pratt Prize** was established in 1962 by the Mr. and Mrs. Horace P. Beesley family of Bountiful, Utah. This family descends from Orson Pratt, the most prominent mathematician in the early leadership of the LDS Church and a member of the Quorum of the Twelve. The Beesley family continued to fund the award until 1989. The prize went to the outstanding graduate in the Department of Mathematics each year. The recipients are listed below.
The Orson Pratt Prize

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Year</th>
<th>Name</th>
<th>Year</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>Lynn E. Garner*</td>
<td>1963</td>
<td>Mary Jo Alleman</td>
<td>1964</td>
<td>Jerry L. Owens</td>
</tr>
<tr>
<td>1965</td>
<td>Kirby McMaster</td>
<td>1966</td>
<td>William A. Williams</td>
<td>1967</td>
<td>Roger Harris</td>
</tr>
<tr>
<td>1980</td>
<td>Steven R. Williams*</td>
<td>1981</td>
<td>Steven Blaine Perkins</td>
<td>1982</td>
<td>No Award</td>
</tr>
<tr>
<td>1983</td>
<td>Alan E. Brown</td>
<td>1984</td>
<td>Gary Reid Lawlor*</td>
<td>1985</td>
<td>Wayne E. Aitken</td>
</tr>
<tr>
<td>1986</td>
<td>Christopher P. Grant*</td>
<td>1987</td>
<td>No Award</td>
<td>1988</td>
<td>No Award</td>
</tr>
<tr>
<td>1989</td>
<td>Scott Cromar</td>
<td>1989</td>
<td>Tyler J. Jarvis*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Future faculty members

The Darrel L. Ross Family Award was established in 1974 by Mr. and Mrs. Darrel L. Ross of Provo, Utah. The award was continued until 1986. This award honored the outstanding student in Mathematics Education each year. The recipients are listed below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Year</th>
<th>Name</th>
<th>Year</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>Candis A. Cannon</td>
<td>1978</td>
<td>No Award</td>
<td>1979</td>
<td>Renee Decker</td>
</tr>
<tr>
<td>1985</td>
<td>Karren Farr</td>
<td>1986</td>
<td>Craig Douglas Seegmiller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outstanding students of mathematics were honored during the years 1965–1976:

1965: Ruth Lynn Cannon  
1966: Vinette Parry  
1967: Evan D. Harrison, Michael McGrew, Boyd A. Pearson  
1968: James K. Heywood, Margaret Hill Nielson, Kathleen G. Smart, Janet Richards Nelson  
1969: Daniel R. Bartholomew, Lynn Hinton  
1970: Gary William Harrison  
1971: Carol Hawker  
1973: Bruce J. Collings  
1976: Matthew C. Morrise, Kenneth L. Klinger, Kent M. Montgomery, Andrew M. Winkler, Howard E. Rew, Gene H. Wicks, Kenneth L. Kuttler

Outstanding student teachers were honored in 1974–1976:

1974: Christine Francom  
1975: Edwin Ruth  
1976: Bruce A. Bishop
Undergraduate research awards in 1980 went to Matthew Morrise and Brian McGhie.

A Karl G. Maeser Scholarship Award in 1978 went to Allen Conrad Robinson.

Pi Mu Epsilon Initiates of 1976 were:

- William P. Armstrong
- Kenneth D. Klinger
- Robin O. Roundy
- Duane L. Bartle
- Bart F. Larsen
- Kent Ruolfson
- James Callister
- William B. Lund
- Bruce Schaalje
- Rodney E. Clawson
- R. LeRoy Madsen
- Richard Shepley
- Paul A. Dalton
- Kent M. Montgomery
- Samuel Shepley
- Paul R. Dean
- Mark J. Morrise
- Reginald H. Stumpe
- Garth F. Fielding
- Matthew C. Morrise
- Hollis M. Thompson
- John R. Grange
- Jacqueline T. Ortega
- David Underwood
- Dennis J. Hulet
- Monica J. Oyler
- Gene H. Wickes
- Katherine L. Jelly
- George Rasband
- Andrew M. Winkler
- Dennis Johnson
- Howard E. Rew
- Merilee K. Witt

The John Einar Anderson Scholarship had been established in 1968 as financial assistance for students majoring in physics, mathematics, and chemistry. John Einar Anderson had graduated from BYU in 1915. Academics and need were criteria for obtaining the scholarship, and scholarship funds varied widely from year to year, depending on earnings and use. Awards in 1976 went to:

- Victor Cary Ashby
- Don D. Goehring
- Merle D. Tenney
- Stephanie Gale Bauer
- Dennis J. Hulet
- David F. Underwood
- Brent Richard Chipman
- Kent M. Montgomery
- Larry D. Colton
- Gary B. Schaalje

Graduate Awards in 1976 went to:

- Kathie Ann Fletcher
- Kenneth L. Kuttler
- Kenneth W. Rees
- Samuel E. Shepley
- David F. Underwood
- Edward Wu.

Under the encouragement of Dr. R. Vencil Skarda, BYU students had participated in the William Lowell Putnam Mathematical Competition since 1965. Eventually, the BYU team began performing very well. A listing of the results and participants appears in the appendix.

**Course Development**

The university catalog of 1954–1955 lists the following mathematics courses; the number in parentheses is the number of quarter-hours of credit, followed by the prerequisite.

**Lower Division Courses**

1. Algebra. (5) One year of high school algebra
91, 92, 93. Differential and Integral Calculus. (4-4-4) Math 13.

Upper Division Courses
100. Differential Equations. (5) Math 98 or 99.
121, 122, 123. Theoretical Mechanics. (4-4-4) Calculus, Physics 41, 42, 43.
131. Theory of Equations (3) Math 93 or 99.
132, 133. Introduction to Higher Algebra. (3-3)
132s. Elementary Statistics. (5)
191, 192, 193. Advanced Calculus. (3-3-3)

Graduate Courses
201, 202, 203. Theory of Functions of a Real Variable. (2-2-2)
211, 212, 213. Partial Differential Equations. (3-3-3)
221, 222, 223. Methods in Mathematical Physics. (3-3-3)
231, 232, 233. Functions of a Complex Variable. (2-2-2)
292, 293, 294. Readings in Mathematics. (1-3)
300. Thesis for Masters Degree.

It was not until five years later that there was much change in these offerings. After Harvey J. Fletcher became chairman of the Department of Mathematics in 1958, the catalog of 1959–1960 listed these course offerings:

Remedial Course
51. Plane Geometry. (0)

Lower Division Courses
101. Intermediate Algebra. (5)
103. Solid Geometry. (3)
105, 106, 107. Basic Mathematics for Technicians. (4-4-4)

Upper Division Courses
307. History of Mathematics. (3)
313. Numerical Analysis Laboratory. (3) Math 312.
491, 492, 493. Seminar. (1-1-1)

Advanced Undergraduate or Graduate Courses
541, 542, 543. Advanced Calculus. (3-3-3) Math 234.
551, 552, 553. Introduction to Topology. (3-3-3) Math 232.

Graduate Courses
617, 618, 619. Mathematical Physics. (3-3-3)
631, 632, 633. Complex Analysis. (3-3-3)
641, 642, 643. Functions of a Real Variable. (3-3-3)
647, 648, 649. Partial Differential Equations. (3-3-3)
671, 672, 673. Modern Algebra. (3-3-3)
681, 682, 683. Linear Algebra. (3-3-3)
695. Readings in Mathematics. (1-3)
699. Thesis for Master’s Degree. (arr.)

Some comments can be made about these courses. The high school courses Algebra I, Algebra II, and Plane Geometry have been in and out of the college curriculum since 1901. Trigonometry has almost always been present. College Algebra (Algebra III) received that name in 1913 and has been in the course offerings ever since. Analytic Geometry was offered from 1901 until 1956; it was integrated with Calculus in 1953 and soon ceased to be a separate course. A course with the name Differential Equations has been in every catalog since 1901. It has grown into an upper division course, has separated into ordinary and partial, and has added applied, technical, numerical, and graduate versions as the field has developed.

By the end of the expansion era, the curriculum had expanded also, and the elementary courses were completely reorganized. The numbering of the courses designated them as non-credit (000 level), lower division (100 and 200 level), upper division (300 and 400 level), advanced undergraduate or graduate (500 level), and graduate (600 level). The calendar was changed back to the semester system in 1960-1961, so a yearlong course was in two parts instead of three. Here is the course listing from the 1977–1978 catalog; the credit in parentheses is in semester hours, followed by the prerequisite.

97. Mathematical Review. (0) Previous registration in pre-calculus or calculus.
100. Elementary Mathematics
   A. Review of Arithmetic. (1)
   B. Beginning Algebra. (2) Math 100A or equivalent.
   C. Geometry. (1) Math 100B or equivalent.
   D. Review of Basic Mathematics. (2)
   E. Intermediate Algebra. (2) Math 100C or 100D.
F. Review of Fundamentals. (1) Math 100E.
105. College Algebra. (3) Math 100E or equivalent.
110. College Mathematics 1.
   A. Polynomial and Rational Functions. (1) Math 100E or equivalent.
   B. Exponential and Logarithmic Functions. (0.5) Math 110A.
   C. Matrices and Linear Equations. (0.5) Math 110A.
   D. Combinatorics. (0.5) Math 110A.
   E. Linear Programming. (0.5) Math 110C.
111. College Mathematics 2.
   A. Trigonometry. (2) Math 110A.
   B. Analytic Geometry. (0.5) Math 111A.
112, 113. Analytic Geometry and Calculus 1, 2. (4-4) Math 110ABCD, 111A.
121, 122. Technical Mathematics. (3-3) Math 100E.
141, 142. Introduction to Calculus and Analysis. (4-4) Math 110ABCD, 111A.
291R, 292R. Honors Seminar in Mathematics. (1-1)
300. History of Mathematics. (3) Math 112, 141, or 301.
301. Foundations of Algebra. (3) Math 110 or 305.
305. Basic Concepts of Mathematics. (3)
307. Mathematics and the Humanities. (3)
311. Introduction to Numerical Methods. (3) Math 109 or equivalent.
332. Introduction to Complex Analysis. (3) Math 214 or 344.
343. Elementary Linear Algebra. (3) Math 109 or 112 or 141.
344. Calculus of Several Variables. (3) Math 113 or 142; 343.
350. Combinatorics and Graph Theory. (3) Math 343.
387. Theory of Numbers. (3) Math 110 or 301.
391R, 392R. Honors Seminar in Mathematics. (1-1)
434. Introduction to Ordinary Differential Equations. (3) Math 344 or {214, 343}.
451, 452. Modern Geometry 1, 2. (3-3) Math 343.
495R. Readings in Mathematics. (1-2)
508. Mathematical Logic. (3) Math 371 or 541.
512. Introduction to Numerical Analysis. (3) Math 411.
513R. Advanced Topics in Applied Mathematics. (3) Consent of instructor.
541, 542. Introduction to Real Analysis. (3-3) Math 344 or 315.
551, 552. Introduction to Topology. (3-3) Math 541 or concurrent registration.
629. Teaching Mathematics in Secondary Schools. (3)
641, 642. Functions of a Real Variable. (3-3) Math 542.
643R. Special Topics in Analysis. (3) Math 542.
645. Tensor Analysis. (3) Math 344 or 542.
651, 652. General Topology. (3-3) Consent of instructor.
655R. Advanced Special Topics in Topology. (3) Consent of instructor.
675R. Special Topics in Algebra. (3) Math 671.
695R. Readings in Mathematics. (1-2)
699R. Thesis for Master’s Degree. (6-9)

Not all of these courses were offered each year; some were offered in alternate years, and others were offered “on demand,” meaning whenever there were enough students to carry them. Generally, a lower-division course needed 10 to 12 students to carry it, upper-division courses, 6 to 8 students, and graduate courses, 2 to 3 students, depending on the current teaching, space, personnel, and financial resources of the department.

Teaching the elementary mathematics courses had always presented a problem. For one thing, students entered the university with widely divergent backgrounds and preparation in mathematics. They also had very different purposes and uses for the mathematics they studied, depending on the field of study (mathematics, science, engineering, business, biology, etc.) they wished to pursue. Limited resources always dictated that the teaching be done as economically as possible. Teachers of mathematics have always searched for methods that improve the students’ acquisition and retention of mathematical knowledge. Thus there has been continual experimentation with the organization and teaching of mathematics courses.

The catalog listing above of the 1977–1978 courses reflects a major effort at presenting the “pre-calculus” courses in an organization called Modular Teaching. Dr. Hal G. Moore and a committee of nine other faculty members worked out this very flexible organization in 1972 so that students could conveniently fill in the material they lacked. The modules were short and simple enough that they could easily be taught by graduate teaching assistants, the most economical teachers. Dr. Lou Chatterley supervised the modular courses starting in 1974. This approach was maintained (eventually with some modifications) until 1984, by which
time the general level of preparation of entering BYU students no longer justified the considerable administrative effort of the modular method.

Other efforts at making the pre-calculus and calculus courses more effective had been attempted from time to time. One way to improve cost-effectiveness was to teach large sections, ranging from 50 to 250 students at a time, sometimes with additional “quiz sections” of smaller size, sometimes without. Control groups of 15 to 24 students in a class were taught the same materials and studies were carried out (usually as graduate student thesis projects) to compare the effectiveness. One such experiment in 1958 found that, though students seemed to prefer small sections, performance on exams was not significantly different across class size. Another conclusion was that the instructor had more effect on student achievement than class size did. [Olpin, p. 61]

Technology has been exploited in these attempts, as well. For example, Dr. Ronald Jamison worked extensively during 1969–1971 on television presentations in College Algebra and Trigonometry, creating about 40 video clips of 47 minutes duration that students could view on demand. The instructional plan required students to view the appropriate video clip on Monday, using cubicles in the library set aside for that purpose. They would then begin the homework assignment on that segment and meet in a “homeroom” section with 20–25 students on Tuesday where a graduate teaching assistant would provide help and clarification. On Wednesday, all 250 students in the large section would meet with Dr. Jamison; he would briefly recap the material of the video clip and then answer questions. On Thursday, the students would again meet in the small homeroom section, where a quiz on the material would be given and discussed. Full hour exams were given at about three-week intervals and a final exam was given at the end of the course. To test the effectiveness of the approach, results were compared with student performance in sections of 30–35 taught in the traditional way and taking the same exams and final. In the large-section, video-enhanced sections, students scored 10–20 points higher on the final exam.

In 1972, Dr. G. S. Gill began using computer-generated exams in large-section calculus classes. The invention of the electronic calculator in 1971 had a very significant effect on science and engineering courses, but did not seem to affect the teaching of college mathematics until the graphing calculator appeared in 1988.

Many sections of the same course prompted the use of departmental final exams to promote uniformity in content and grading. Departmental exams were instituted as early as 1956 and have been used often since then. Scheduling and test security have always been problems, met with more or fewer satisfactory results as university facilities and technology have offered different options.

Program Development
Requirements for mathematics majors in 1954 offered two tracks, depending on the preparation of the student. For weaker students, the basic required courses were:

- College Algebra, Trigonometry, Analytic Geometry (5-5-5)
- Differential and Integral Calculus (4-4-4)
- Differential Equations (3-3)
- Applied Mathematics (3)
For stronger students, the basic required courses were:
- Analytic Geometry and Calculus (5-5-5)
- Calculus and Differential Equations (5-5-5)
- Applied Mathematics (3)

In addition, both groups of students had to complete one of the sequences:
- Theoretical Mechanics (4-4-4)
- Theory of Equations, Introduction to Higher Algebra I, II (3-3-3)
- Advanced Calculus (3-3-3)

The requirements were careful to point out that Intermediate Algebra could not be counted toward the major.

The following year, the College of Physical and Engineering Sciences established entrance requirements that mathematics majors were expected to satisfy, namely the high school courses
- 3 units of English
- 3 units of Mathematics
- 1 unit of Physical Science

Other requirements for the major were unchanged and were to remain so for the following year as well.

The catalog for 1956–1957 simply specified that mathematics majors must complete 27 quarter hours of upper division courses approved by the chairman of the department. In other words, lower division courses no longer counted for the major, but were available if prerequisites had to be met. The department also proposed a four-year schedule of classes, amounting to 16 or 17 credit hours each quarter. The upper division courses were:
- History of Mathematics (3) (New)
- Engineering Mathematics (3-3-3)
- Introduction to Statistics (3-3-3)
- Differential Equations (3-3)
- Vector Analysis (3)
- Theory of Equations (3)
- Introduction to Abstract Algebra (3-3-3) (New)
- Theory of Numbers (3) (New)
- Advanced Calculus (3-3-3)

The 1958–1959 catalog spelled out requirements for mathematics education majors. They were required to earn 33 credit hours of education classes; they could earn 9 hours of upper division mathematics classes and have a degree in Education with an emphasis in Mathematics, or they could earn 27 hours of upper division mathematics and have a degree in Mathematics with an emphasis in Education. Requirements for the mathematics major were unchanged, though additional upper division courses had been introduced.

The 1959–1960 catalog introduced a mathematics placement exam, required of all freshmen who intended to take mathematics courses. This was an effort to reduce failure/drop-out rates, especially in calculus. The calculus course could only be taken as a freshman if the score on the placement test was high enough. Requirements for the major remained 27 hours of upper division mathematics courses, but now the yearlong sequence of Advanced Calculus was required. Passing a comprehensive written exam was newly required of all senior
mathematics majors. This exam usually was the Graduate Record Exam in Mathematics, which had recently become available on a national basis. “Passing” scores were in practice set by the department year by year.

In the 1960–1961 catalog, mathematics courses were reorganized to fit the move back to the semester calendar. Added was the requirement that only grades “C” and above would be allowed to count for the major.

The 1962–1964 catalog required mathematics majors to take the upper division courses Ordinary Differential Equations, Modern Algebra, Linear Algebra, and two semesters of Advanced Calculus, along with nine additional hours (three courses) chosen from certain other upper division courses. Majors were also strongly urged to gain competence in one of the foreign languages German, French, or Russian.

In 1964, the requirements dropped the specific courses, Linear Algebra and Advanced Calculus II, replacing them with Complex Analysis and an additional course in an upper division class. The Linear Algebra and Advanced Calculus II courses were strongly recommended, however.

By 1970, the introductory course in Analytic Geometry and Calculus had been split into two tracks, one for Science-Engineering and one for Mathematics majors. The requirements for a BS degree in Mathematics were spelled out to include the following:

- Introduction to Calculus and Analysis (4-4)
- Intermediate Calculus and Analysis (4-4)
- Introduction to Complex Analysis (3)
- Abstract Algebra I (3)
- Advanced Calculus I (3)
- Abstract Algebra II or Advanced Calculus II (3)
- Five additional upper division courses (15)

The requirements for a BA degree in Mathematics Education were similar, except that the courses Analytic Geometry and Calculus I, II, III (4-4-3) could be substituted for the four Calculus and Analysis courses, two “foundations” courses were required along with Abstract Algebra I and Advanced Calculus I, and three additional upper division courses were required, including some designed more for the education majors.

In 1973, the requirements for the BS degree in Mathematics allowed for several options:

- Mathematics
- Computational Mathematics
- Preprofessional Mathematics (leading to law, business, or medical school, etc.)
- Biomathematics
- Physicomathematics
- Sociomathematics

The requirements were essentially as they had been, but with specified courses, some in other disciplines, providing the emphasis a student might desire. It was also suggested that a well-prepared student might fulfill the requirements in three years, and a suggested three-year outline of courses was given. In 1976, the BS in Mathematics options were

- Mathematics
- Computational Mathematics
Preprofessional Mathematics
Mathematics-Science (a combining of the last three above)
Mathematics-Philosophy.

In 1977, degree requirements remained the same, and the requirements for graduate degrees were also set out:

MS in Mathematics (preparing for PhD work):
- Prerequisite: a BS in Mathematics
- 18 hours of graduate mathematics courses
- 9 hour of a minor
- 6 hours of thesis credit

MA in Mathematics (preparing for secondary or junior college teaching):
- Prerequisite: a BA in Mathematics Education, or equivalent
- 24 hours of mathematics courses
- 6 hours of thesis credit
- State teaching certification

MA in Mathematics Education (preparing for teaching or administration):
- Prerequisite: in-service status in secondary teaching
- 24 hours of mathematics courses (at least 20 from 500- and 600-level)
- 12 hours of specified education courses

Year-by-year additions to the list of requirements were usually cumulative. It is evident that the general trend was to strengthen the mathematics majors and to make them better prepared for a variety of careers. (It was often stated to the students, “Employers think that if you can do mathematics, you can do anything.”) Strengthened programs were made possible by increased capability of the faculty and increased preparation of the students as entering BYU became more competitive. There had been discussion during the 1960s and again during the 1970s of designing a Ph. D. program in mathematics, but the strength of the faculty and the resources of the university were not yet sufficient to warrant it.

Facilities

Despite the rapid growth of the university, there was no space devoted to the Department of Mathematics. The chairman’s office was sometimes in the Eyring Science Center, sometimes in temporary barracks east of the Science Center, and eventually in the Faculty Office Building on the edge of the hill where the “Y” Stadium had been. Faculty offices and classrooms were wherever space could be found, with considerable sharing of offices. By 1968, the Department of Mathematics was the fourth largest department on campus, serving more than 11,000 students annually, and offering 185 classes, held in 17 different buildings! [Wilkinson, V.3 p. 251]

The Talmage Building

Computers were beginning to invade many disciplines, and a new Computer Science major had been formed in about 1963. Enrollment in it increased tenfold in the next five years, twenty times faster than the growth rate of the student body. Because computers and mathematics were related, it was proposed that a new building be created to house them, as well as the university’s computer center. This proposal was made in 1966, but because of other building commitments, was not approved until January 1969. The building was
completed in December 1970 and the faculty moved in during the Christmas holidays. It was located west of the Harold B. Lee Library, between the Smith Family Living Center and the Jesse Knight Building. It was dedicated by Elder Delbert L. Stapley of the Quorum of the Twelve as the James E. Talmage Mathematical Sciences and Computer Building on 19 February 1974. After a short time, the building was designated as TMCB, the Talmage Mathematics Computer Building.

Most of the credit for the design and approval of the new Talmage Building goes to Kenneth L. Hillam, who was chair of the Department of Mathematics during that time. The TMCB included over 63,500 square feet of floor space, of which 14,000 square feet were dedicated to the university’s computer center (the mainframe computer itself took up 4,000 square feet in those days!). The building provided 100 faculty offices and 30 classrooms. Its innovative three-level design was finished in an exterior of golden buff brick and white pressed stone, harmonizing it with other buildings on campus.

The decorative stone on the east and west ends of the south section of the building was embossed with mathematical symbols, declaring the building’s purpose to all who could read it. As originally constructed, a pool and fountain at the east end was a pleasant place to all approaching or leaving the building; maintenance problems prompted removal of the fountain a few years later.

At the faculty meeting of the Department of Mathematics held in the new building on 12 January 1971, the minutes reported, “[Dr.] Fletcher expressed appreciation for the new building and for Dr. Hillam and all those who had part in the planning and completion of this building. The faculty applauded.” [Olpin, p. 67] Those who were present can say that this report is wonderfully understated!

Even with the additional classrooms, mathematics classes continued to be taught in several other buildings across the campus. The Talmage Building housed the departments of
Mathematics, Statistics, and Computer Science. The Department of Statistics had been formed in 1960 with Howard C. Nielson as chair; Alvin Rencher transferred from Mathematics to Statistics. The Department of Computer Science was formed in 1969 with C. Edwin Dean as chair; John Higgins, Robert Burton, and Douglas Campbell eventually transferred from Mathematics to Computer Science.

The Math Lab

The Math Lab came into being shortly after the move to the Talmage Building. Dr. Jaqueline Taylor Voyles, a long-time administrator of the Math Lab, tells of its early years.

Development of the Math Lab
Jaqueline Taylor Voyles

In 1975, the chair of the Mathematics Department, Kenneth Hillam, asked a faculty member of the Mathematics Department, Dr. Charles N. Walter, to scan the country to become familiar with a variety of math labs springing up at universities and colleges, discover the goals of these labs and how they accomplished these goals. As a graduate student, I was assigned to assist Dr. Walter in exploring several of these programs. Some labs were developing alternative teaching and learning modes including hands-on activities to enhance discovery and learning. Others offered tutorial support to students enrolled in math courses.

The earliest math lab at BYU was located in a graduate student office in the TMCB. Two graduate students were assigned to offer tutorial assistance and to develop demonstration materials and hands-on experiments for use in the classroom. This small lab grew to a lab with six tutors, calculators (very old vintage), and a large NOVA computer with a card reader.

During the 1970's, many students entering the university were lacking sufficient skill in mathematics, reading, and writing. In response to this, the university developed and put into place new reading, writing, and mathematics standards. Students were required to either enter the university with a minimum ACT score in these areas or pass an exam, referred to as a general education exam, before graduating. Courses were developed by the English Department and Mathematics Department to support students who needed help passing these exams.

The mathematics course was designed as a self-study, non-lecture course, with special study materials and tutorial assistance in an open study lab. The math lab and most of its resources joined the reading/writing lab in the Harold B. Lee Library. The enrollment in these courses varied between 900 and 1000 students per semester. Due to these large numbers, testing was done in the newly formed BYU Testing Center, also located in the HBLL. Students were allowed to retake different forms of the exams, so in addition to the tutorial part of the lab, a secured test feedback area was developed, where students could sit with a tutor and review errors they made on exams.

For the first three years of these labs supporting general education (1976—1979), the Math Lab was located in the HBLL. The head of the Math Lab was Corinne Baker. Charles N. Walter and later, Louis J. Chatterley, were the faculty supervisors. In Fall Semester of 1978, I was hired to run the lab. I served as head of the lab and major developer of services for the next 15 years. (To be continued.)
Part II. The Growth Years: 1978–1990

The information for this part of the history is taken mostly from university catalogs and from reports of the deans of the College of Physical and Mathematical Sciences submitted from 1978 to 1989. The college reports were based on information from the departments and on faculty interviews conducted by the deans. The university would not collect reports directly from the departments until 1991.

These years cover the chairmanship of Peter L. Crawley, who had come to BYU from the California Institute of Technology in 1971 as a visiting professor. He became a permanent member of the Math Department faculty in 1973. He had earned his BS and PhD degrees from CalTech in 1957 and 1961. His mathematical specialty was group theory. He had a vision for the BYU Mathematics Department and made a profound impact as administrator.

The deans of the College of Physical and Mathematical Sciences during his administration were Elliot Butler, Rex Goates, and Grant Mason. Dr. Crawley worked with these deans and the general administration of the university to enhance the capabilities of the Mathematics faculty in research and scholarship. This was Dr. Crawley’s overriding goal.

This effort could proceed along several avenues. The most obvious was the hiring of faculty members with active research programs. Others were the sponsoring of “special years” and the organization of special conferences on chosen topics that would attract visitors and spark interest in those areas. Another was the hiring of “post-docs” into temporary positions to support research in certain areas. Another was the development of a PhD program that could attract strong graduate students.

All of this had to be done while also carrying out the responsibilities of the Department of Mathematics to its students and to the university at large. The need for expertise in mathematics on the part of many students who were majoring in other areas, such as science, engineering, computer science, statistics, business, biology, etc., created an enormous service load for the department. The university had also established “General Education” requirements; students could not graduate unless they could demonstrate competence in (among other things) mathematics at the Algebra II level at least, creating additional scores of students to teach. The teaching of the students also had to be effective; high drop-out or failure rates in remedial courses would be a significant problem, and inability of science or engineering students to use the mathematics they had supposedly studied would be even more concerning.

A competing aim for the department was the training of mathematics teachers for the schools. This involved not only the teaching of mathematics, but also matters of pedagogy and practicum. Oversight of many student teachers required extra hours of supervision and
the cooperation of public schools. The investigation of effective methods of teaching elementary mathematics to young students involved research of a totally different nature than research in pure or applied mathematics.

Finally, preparing mathematics majors for careers in mathematics-related areas and for graduate school required thorough tutoring in the details and methods of mathematics in several different branches of the subject. This kind of teaching was perhaps most easily reconciled with pure research in mathematics, but because of the varied aims of the students in upper-division courses, teaching effectiveness was still a concern.

Thus, the aims of the department in its various responsibilities required setting goals in many areas; few faculty members could, even if they had the interest, perform equally well in all these aspects of professorship. Articulating the goals, not only of the department, but also of the university, was not easily accomplished, particularly as goals seemed to change over time. Tensions between the department and the administrative units of the university and between groups of faculty members within the department would grow to alarming levels as the turn of the century approached. Achieving a balance in these aims, jointly by the Department of Mathematics and the university administration, remains a work in progress.

The administrative style of Peter Crawley differed quite markedly from that of his predecessor. Department faculty meetings became quite rare events, eventually occurring only once or twice a year instead of every month. Dr. Crawley preferred to work behind the scenes with the dean and academic vice president to accomplish his objectives. Many faculty members were unhappy with what they perceived as the loss of opportunity to discuss important departmental decisions, contributing to growing tensions.

Organization


Jaqueline Taylor Voyles was hired in 1978 as administrator of the Math Lab; she served there until 1993. In 1989, the department succeeded in hiring at least part of the services of a computer systems manager, Jan L. Peterson. He served in that capacity until 1995.

As the end of the decade of the 1980s approached, the dean began recommending a much more active committee structure in the department. This committee organization became the norm during the next decade. Assessment of faculty performance also began to focus on three general areas: teaching, scholarship, and citizenship (willingness to help the department, the college, and the university carry out their organizational responsibilities, as well as contributing to the advancement of mathematics in other than scholarly ways). These
three areas would become the guiding concept in coordinating the aims of the department with those of the university.

**Faculty**

The Dean’s report of 1979–1980 explained to the university administration that the context of research in the college, and hence in the Mathematics Department, was not entirely for its own sake, but mainly for the support of the graduate programs. In the following years, the deans supported Dr. Crawley in seeking to hire faculty with active research programs. This support was based on feelings that the Mathematics Department was understaffed, given its service load, and some of its members also needed prodding in the direction of professional development.

In 1988, the college had done some comparisons of BYU with three other universities, Arizona State, Utah, and Washington, mainly for the purposes of salary decisions. They also discovered some interesting comparisons in terms of numbers of faculty, teaching loads, and administrative and staff support. The following table compares the BYU Math Department with the average of the other three math departments.

### Math Department Manpower Comparisons

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Number of Students Taught</th>
<th>Admin. and Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Majors</td>
<td>Grad St.</td>
</tr>
<tr>
<td>BYU</td>
<td>42</td>
<td>299</td>
</tr>
<tr>
<td>Average</td>
<td>51</td>
<td>309</td>
</tr>
</tbody>
</table>

The hiring of new research-active faculty was difficult because the pool of potential hires was chronically small. The result was that about half of the hires that occurred during those years were of non-LDS personnel, causing some concern in the university community. Permanent faculty members hired by the Mathematics Department during the administration of Peter Crawley were as follows:

1978  Jaqueline Taylor-Ortega
1979  Robert G. Clawson
1981  Wayne W. Barrett, Jasbir S. Chahal, Rodney W. Forcade
1982  Andrew D. Pollington
1983  David G. Wright
1984  Peter W. Bates, Robert D. Speiser
1985  William V. Smith
1986  James W. Cannon
1987  Stephen P. Humphries
1989  William E. Lang
1990  Kening Lu, Michael E. Lundquist
1991  Roger C. Baker

Almost all of these new faculty members had active research programs and sparked increased interest in mathematical research among the faculty. They also formed the impetus for other stimulation of research, such as special years, special conferences, and development of a Ph.D. program.
Robert Speiser organized a series of conferences in Algebraic Geometry, held at Sundance in August of 1984, 1985, and 1986. Jim Cannon and David Wright organized a Summer Research Conference in Topology, held on campus and at Sundance in August 1987. David Wright and three colleagues from outside BYU organized the Western Topology Workshop, held at BYU in July 1989 and attracting about 20 experts from around the country. Wayne Barrett was one of five organizers who hosted the August 1989 inaugural meeting of the International Linear Algebra Society at BYU, attracting 85 specialists from 15 countries; he and Donald Robinson edited the proceedings in an issue of *Linear Algebra and Its Applications*.

Peter Bates organized a Special Year of Partial Differential Equations in 1986–1987 that brought about twenty researchers to BYU for short or extended stays, including Nicholas Alikakos and Paul Fife. Two conferences, one of them at Snowbird, were part of the Special Year and attracted about a hundred visitors. Peter Bates reported,

> Apart from the obvious benefit to the mathematics world as a whole in the way of new theorems proved and new collaborative projects started, the benefit to mathematics at BYU is immeasurable, the effects to be felt for years to come. Our department is now viewed as one of the more active Mathematics departments in the country—especially by foreign visitors, who tended to call our department “the institute.” I believe that all visitors left with warm feelings towards BYU and several expressed an interest in returning, perhaps on a more permanent basis. Certainly many of these will seriously consider advising their promising students to enroll at BYU for their graduate studies—a welcome boost to our new PhD program.

Robert Speiser organized a successful Year of Algebraic Geometry, beginning with a conference in August 1988. William Lang from Minnesota visited the department for the ensuing year, and Stein Arild Stromme from Bergin and Lawrence Bin from Illinois Chicago each visited for a semester.

The sponsoring of special conferences and special years would become a regular feature of the BYU Department of Mathematics.

Scholarly productivity of the faculty generally increased during the decade of the 1980s. The following table shows the number of papers produced, as well as the size of the total teaching load of the department. We see that the total teaching load remained fairly constant; the increasing cost per student credit hour (SCH) reflected not only some inflation but also the additional cost of technology.

<table>
<thead>
<tr>
<th>Year</th>
<th># Faculty</th>
<th># Papers</th>
<th>Fall SCHs</th>
<th>Ave.Cl.Size</th>
<th>Cost/SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982–1983</td>
<td>35</td>
<td>6</td>
<td>18681</td>
<td>62.5</td>
<td>$24.90</td>
</tr>
<tr>
<td>1983–1984</td>
<td>32</td>
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<td>16686</td>
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<tr>
<td>1984–1985</td>
<td>36</td>
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<td>18104</td>
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<td>$27.49</td>
</tr>
<tr>
<td>1985–1986</td>
<td>40</td>
<td>18</td>
<td>17386</td>
<td>64.1</td>
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</tr>
<tr>
<td>1986–1987</td>
<td>40</td>
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<td>17108</td>
<td>61.1</td>
<td>$36.52</td>
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<tr>
<td>1987–1988</td>
<td>40</td>
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<td>16791</td>
<td>50.8</td>
<td>$38.94</td>
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<tr>
<td>1988–1989</td>
<td>42</td>
<td>28</td>
<td>18398</td>
<td>56.4</td>
<td>$39.10</td>
</tr>
<tr>
<td>1989–1990</td>
<td>36</td>
<td>20</td>
<td>18293</td>
<td>44.4</td>
<td>$42.94</td>
</tr>
</tbody>
</table>
University standards for rank advancements increased markedly during the late 1970s and the 1980s. Whereas it had been the case that time in rank was the major (or only) consideration, the college and university now expected much more in the way of scholarship, excellent teaching, and service to the department and the discipline. Eventually, a permanent-track faculty member would be hired, typically as an assistant professor, with agreement that there would be a thorough third-year review; if expectations were met, then admission to continuing-track status would be granted. If performance were not satisfactory, the teaching contract would not be renewed. At the end of six years, another thorough review would take place and if expectations were met again, continuing status would be granted along with advancement to associate professor. Advancement to full professor could be sought after another six years and required substantial contributions to the discipline, to teaching, and to citizenship, supported by internal and external recommendations.

**Student Achievement**

For the decade of the 1980s, we have the following data on majors and graduates. The sharp increase in the numbers of Masters graduates reflects the emphasis throughout the decade on scholarly productivity.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Majors</th>
<th>Number of Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>Graduate</td>
<td>Bachelors</td>
</tr>
<tr>
<td>1981–1982</td>
<td>165</td>
<td>7</td>
</tr>
<tr>
<td>1982–1983</td>
<td>167</td>
<td>8</td>
</tr>
<tr>
<td>1983–1984</td>
<td>254</td>
<td>7</td>
</tr>
<tr>
<td>1984–1985</td>
<td>289</td>
<td>6</td>
</tr>
<tr>
<td>1985–1986</td>
<td>298</td>
<td>10</td>
</tr>
<tr>
<td>1986–1987</td>
<td>292</td>
<td>16</td>
</tr>
<tr>
<td>1987–1988</td>
<td>299</td>
<td>22</td>
</tr>
<tr>
<td>1988–1989</td>
<td>303</td>
<td>26</td>
</tr>
<tr>
<td>1989–1990</td>
<td>353</td>
<td>24</td>
</tr>
</tbody>
</table>

The BYU Putnam team began to place in the top 50 nationally in 1979; this would prove to be the case in a majority of the contests up to the present. The listing of results and participants, so far as is known, appears in the appendix.

The Orson Pratt Prize for the outstanding Mathematics graduate continued until 1989, and the Darrell Ross Family award for the outstanding Mathematics Education graduate continued until 1986, as tabulated in Part I.

A student chapter of Pi Mu Epsilon had been established sometime during the 1960s and continued to flourish during the 1980s. The Math Club was started in 1961 with Robert Rennie as the first president and Hal Moore as the first faculty advisor. With Dr. Jan E. Wynn as advisor from 1981 to 1996, the Math Club conducted several activities each
semester, including winter activities at Aspen Grove. Many members of the department made presentations at the Math Club meetings during these years.

**Course Development**

During this era, concerns about particular courses focused on three areas: the elementary courses supporting the university’s GE requirements, the calculus courses, and engineering mathematics.

The “GE” courses were Algebra II and College Algebra. The GE requirements greatly inflated registration in these courses beyond what was needed as prerequisites in various majors. The initial response to the large numbers of students was to form large classes. It quickly became evident that additional efforts were needed; between 1984 and 1987, failure/drop-out rates in these courses were hovering around 37%. The Math Lab was a great asset for improving performance in these courses, and the effort was made to reduce class sizes. In addition, graduate teaching assistants, who taught most of the classes, were given specific training by experienced professors at the beginning of each semester, initially under the direction of Dr. Jan Wynn. As a result, failure/drop-out rates fell to 20%–26% in 1987–1989 and to 11% in 1990. It was concluded generally that the effectiveness of individual instructors was more important for student success than class size. Consequently, workshops for graduate teaching assistants became a regular activity of the department.

The Modular Teaching in Algebra II and College Algebra that had been formed in 1972 were finally abandoned in 1984 and the department returned to the traditional organization of those courses. By this time, the general level of preparation of BYU students did not demand the flexibility that modular teaching had provided and the administrative overhead of the modular courses was high. As the demand for remedial courses became less diverse, the simplification of the course offering was welcomed.

The main concern with calculus courses was with the large numbers of students. Again, large classes were formed, and the Math Lab assisted with student tutoring, exam feedback, and other logistics. It was also felt that large sections were not necessarily best for the students, but limited resources offered few alternatives. Faculty generally did not enjoy teaching large-section calculus, so a rotation schedule was established to make sure each faculty member did his fair share. Some faculty figured out ways to trade assignments with those more willing to teach the large sections. It was rather ironic that some faculty preferred to avoid teaching the beginning core course of their discipline.

The main problem with engineering mathematics was insufficient time for engineering students to take the courses required. All engineering students took the regular Calculus I and Calculus II courses. They also needed the mathematics covered in Calculus III, Linear Algebra, and Differential Equations, a total of 9 credit hours. Unfortunately, the engineering departments could only require 5 or 6 hours of additional mathematics topics, because of limitations on overall major-hour requirements the university had put in place. Consequently, the College of Engineering and Technology worked with the Department of Mathematics to create separate courses in Engineering Mathematics to cover as many of those topics as possible in the 5 or 6 hours available.
After Engineering Mathematics courses were created, it was usually only a matter of a couple of years before the courses proved unsatisfactory. Part of the problem involved changes wrought by advances in technology, such as the introduction of electronic calculators and computers, but the organization of the courses always left something to be desired. Most math faculty were uncomfortable teaching the topics so quickly and engineering faculty felt that still other topics were needed. Consequently, the Math Department became accustomed to revamping the Engineering Mathematics courses every three or four years.

Program Development

In 1983, the requirements for the BS degree were simplified. The emphases Mathematics, Computational Mathematics, Pre-professional Mathematics, Mathematics-Science, and Mathematics-Philosophy that had been established in 1976 were dropped, replaced by a list of core courses and optional sequences, as follows:

Core courses: Calculus I, II, and III, Linear Algebra, Fundamentals, Abstract Algebra, Combinatorics or Graph Theory, Differential Equations, Advanced Calculus, Complex Analysis, a computer language, and a calculus-based Statistics course.

One of the two-semester sequences: Numerical Analysis, Partial Differential Equations, the second semesters of Abstract Algebra and Advanced Calculus, or Topology.

Six additional hours: upper division Mathematics (not those designed for Mathematics Education), Computational Complexity, Advanced Probability, or Vector and Tensor Analysis.

Senior Tutorial (a seminar) and a comprehensive examination (GRE)

Requirements for the BA degree in Mathematics Education had already been set in this pattern several years earlier, as follows:


Nine additional hours: upper division Mathematics.

A teaching minor, and Teacher certification.

Efforts to develop a PhD program began in 1985, though it had been a hope for at least two decades before that. The program was inaugurated in 1987 with four students and several Master’s level students who might become interested in the PhD. The first PhD degrees would be awarded in 1993. The concern was whether BYU could attract students into the PhD program from outside BYU. These concerns were not to last very long, as it turned out.

Facilities

While the construction of the Talmage Building was gratefully hailed as a wonderful facility for the department, it quickly became less than adequate to college needs. The following paragraph extracted from the Dean’s report of the year 1979–1980 indicates the pressure on
available space to conduct the activities of Mathematics and the other departments in the college:

The Mathematics Tutorial lab has continued to expand in its new location in Knight Mangum Hall. It has, however, already outgrown that area and has had to restrict the calculus students’ use to evenings only in order to serve the math 100D and 110 students. Plans to expand into 192, an adjacent area of about half the present size, was temporarily stopped to allow a pilot program for a Physics Tutorial lab in their Physics 121, which has increased in enrollment beyond their capacity to handle in the traditional quiz section mode. Computer Science programs have increased in enrollment, which has caused serious crowding of the Talmage building. It resulted in the dislocation of the Applied Mathematics Lab to the basement of the Maeser building.

The dean noted in the 1986–1987 report that, among college pressing needs, “Space in the Talmage Building remains perhaps the most vexing problem.” Two years later, the dean noted that increases in the Mathematics graduate program further exacerbated the space problem, but expressed hope that projected remodeling of the Talmage Building would bring some relief. In June 1989, the dean noted that remodeling under way should provide adequate space for Computer Science, Statistics, and Mathematics for the next decade. An additional three-story wing was added to the west end of the Talmage Building; the breezeway was replaced by an extended foyer and a lecture theater. The remodeling was completed in September 1990. Even with the additional space, the dean reported in 1990 that as Mathematics sought to reduce the number of large-section courses, there would be additional need for classrooms.

As noted above, the Math Lab continued to be very busy, even in its remote location from the Talmage building. Dr. Jaqueline Taylor Voyles continues her history:

By 1979, student use of the Math Lab increased to the point where it outgrew the space in the library. The lab was moved to the Knight Mangum Building where a large space was remodeled and specifically designed to support course development, tutorial support, and high security for exam feedback for the two courses that prepared students for the General Education Exam. Tutors were carefully trained to teach in a way that not only answered student questions, but also allowed and encouraged students to think on their own. Having students learn major concepts that covered a great variety of problem situations was the goal of the tutorial support and course development.

In 1980, the College Algebra and Trigonometry courses, then taught in very large sections, began utilizing the math lab services of tutorial and exam feedback. Another large space was opened and remodeled to accommodate these students.

In 1982, Calculus I, Calculus II, and Business Calculus became large section lecture courses. This created a need for tutorial and exam feedback for another very large group of students. A third space was opened and remodeled to accommodate this new population. The tutorial staff was increased as well as efforts involved in training these new tutors to effectively serve this new student population.

As computers became a major tool in certain mathematical calculations requiring powerful algorithms, Dr. G.S. Gill and Dr. Richard Hansen opened a Numerical Analysis lab on the floor above the Math Lab in the KMB. The Statistics Department also joined the main lab and hired tutors to assist students enrolled in large population statistics courses. The Math Lab head scheduled and supervised their work.
Computing became more prominent in the management of mathematics courses in those years. Dr. Rodney Forcade reminisces:

When I got back from Puerto Rico in 1981, we were all making use of the VAX computers over in the Clyde building, managed by Stan Peters and Paul Malmquist (I think). We were more playful in those days. Chuck Walter, upon learning that I was teaching large section College Algebra, decided to play a joke on me. He managed, somehow, to alter the printout of my students’ first common exam—so it appeared they all failed. I felt terrible, and planned an apology to my entire auditorium full of students, before Chuck revealed the joke. I retaliated by hacking into his VAX account and fixing it so that every time he logged in, it instantly logged him out. Stan Peters found out about that, and fixed the computers so our accounts couldn’t be hacked any more. He was such a wet blanket.

When IBM created the first personal computer, the faculty decided to move in that direction. Eighteen Mathematics faculty members agreed to teach an additional course each during Fall Semester 1983 so the department could afford an IBM PC for each of them. Lynn Garner, who was associate chair that year, supervised configuring the computers and orienting the faculty on their use. The PCs came on line in January 1984, the same month that the Apple Macintosh with the capability to create fonts was announced. Thus began a long period of innovation in the use of computers, not only for personal office applications and course administration, but also for creative, scholarly, and instructional purposes.

In appealing to the university administration for additional funding for computers in 1988, the Dean said, “Mathematics is trying to enter the computer revolution with a capital equipment budget of $2800!” (That amount would not have purchased a single workstation in those days.) He also noted that Mathematics was lagging behind the rest of the college in computer use, but that the college had provided $60,000 at the end of the year to help get things started.

By 1988, use of the college mainframe computer, the VAX 8600, was discontinued as “distributed computing” came into being, decentralizing computer use. The Department of Mathematics was able to use one faculty FTE to temporarily obtain the services of a systems manager for the growing network of personal and instructional computers; using a similar strategy, the college was able to fund a representative from Information Systems Services (later, Computer Services) for support of the network of computers in the college, most importantly in the Computer Science and Mathematics departments.

Dr. Forcade continues his reminiscences:

At some point in late Eighties (I think) we were kicked off the VAX, and told that every department should have its own server. After due consideration, we bought a Mips M100, with a special card (a kludge, as it turned out) to handle an Appletalk network. We installed the Appletalk wiring, and some of the ethernet connections, but I don’t remember all the details of that. When we planned to connect to the campus network, Bill Ivie told us he would connect us through CS, but I had to get into the ceiling and run a lot of thin-wire ethernet myself—down to where Bill could connect us up to their network. We had a bunch of dumb terminals and a few X-terminals as I recall. I took a leave from teaching and acted as the department CSR for one semester, before we hired Jan Peterson. I was very proud of myself when I managed to correct an error in our sendmail-cf file (acquired from the Mips company), which the campus trouble-
In 1989, the Dean noted that space for instructional use of computers was hard to find. In particular, current plans to use computers for instruction in Mathematics would create need for much additional space. He said, “I believe that Mathematics is a ‘sleeping giant’ that will shortly be aroused with an enormous appetite for computers for instruction.”

The electronic calculator had appeared in 1971 and a programmable version came less than a year later. This innovation immediately eliminated the use of the slide rule and such common mathematical processes as interpolation and the use of numerical tables. Since the calculator was used for calculating, it had a profound effect in science and engineering courses, but it did not really change the way mathematics was taught. Widespread discussions arose about whether calculators should be allowed in elementary math courses, but in university-level math courses, in which mere computation was not the point, professors essentially ignored calculators.

This changed suddenly when the graphing calculator appeared. In January 1988, 1200 mathematicians went home from the annual math meetings in Atlanta with the new Hewlett-Packard HP28S graphing calculator. As one professor reported the next week, the calculator could pass his calculus final all by itself: it could not only draw graphs, but also differentiate, integrate, find extrema, compute volumes without using decimal approximations for \( \pi \) and \( e \), and carry out all the algebraic manipulations to boot. All that the student had to do was enter the function, and the calculator did the calculus at the push of a button.

Of course, the student had to know which operations should be used (i.e., which button to push); very soon, calculus courses all over the country began focusing on teaching students how to set up functions and which calculus processes to use for which objectives, spending much less time on the rules for differentiation and integration and even on algebraic manipulation. Professors began investigating just how much mathematical manipulation the new calculators and their even more powerful successors could do, eventually wondering how much the calculator should do in a math course. As a consequence, just how much mathematical manipulation should be required of students became a major discussion point. This discussion would last through the next decade or more and may not be entirely at rest yet.

At BYU, an HP Calculator Club sprang up, encouraged by the BYU Bookstore. Dr. Lynn Garner, who had been invited by Hewlett-Packard to be a member of their advisory committee in the development of the third-generation HP 48G, was advisor to the club. Not only were regular applications of the calculators discussed in their intricate variety, but also synthetic programming, games, and even using the calculator as a TV remote control were developed. The club flourished during the early 1990s, but dwindled as Hewlett-Packard essentially relinquished the market to Texas Instruments.

When Jim Cannon joined the department in 1986, he applied for and received an NSF grant to use the BYU BITNET connection. (BITNET was a sort of precursor to the Internet, but connected only educational institutions; it gradually went out of use as the Internet was
developed in the 1990s.) Using this connection, he was able to collaborate with colleagues around the country, apparently being one of the first in the department to carry on digital collaboration.

The Mathematics Department library had a major growth spurt (if not its actual beginning) during the mid 1980s. Jasbir Chahal remembers having dinner in Colorado with Sarvadaman Chowla, also a mathematician from India, and discussing what Chowla was going to do with his personal library as he neared retirement. Eventually, Chowla gave his books to Helaman Ferguson, who transferred the boxes to Chahal, who had Leri Dawn Smith label the books as belonging to the BYU Department of Mathematics, and they became the core of the department library. Rod Forcade remembers how pleased we were to have the Chowla library; at the time he was teaching his students about the Bruck-Ryser-Chowla Theorem in combinatorial design. Subsequently, as BYU math professors retired, they often gave substantial portions of their personal libraries to the department and the library grew. It was housed in the TMCB and was zealously guarded so that it was not absorbed into the university library.
Part III. The Maturing Years: 1990–2012

The primary resource for this era of the Department of Mathematics history was the collection of extremely detailed Annual Reports that were required of departments, starting in 1991. Dr. Gill, the compiler of this part, has quoted extensively from the Annual Reports, sometimes prefacing the excerpts with remarks of his own. We thus see the activities of the department as portrayed by the chairmen themselves.

The content of the annual reports was specified by the university administration and changed from time to time. Carefully defined criteria for classifying creative activities of the faculty, reports on leaves and new faculty, and statistics on student enrollment, teaching loads, graduate and undergraduate majors, and costs were among the items requested in the reports. In addition to the portions presented in this section, other items of interest are included in the appendix.

The leadership of the department during these years was as follows:

<table>
<thead>
<tr>
<th>Chairman</th>
<th>Associate/Assistant Chairmen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Darrin M. Doud</td>
</tr>
<tr>
<td></td>
<td>Steven M. McKay</td>
</tr>
</tbody>
</table>

The office staff for these years included an executive assistant and one or two full-time secretaries, together with various part-time student secretaries. Leri Dawn Smith had become executive assistant, in charge of accounting, in 1977 and continued until 2007, when she retired. Subsequent executive assistants were Teisha Vest (2007–2010), Sarah Warcup (April – August, 2010), and Fred Lewis (2011 – present). A 2010 hiring freeze prevented hiring a replacement for Sarah for six months.

This part of the history is divided into sections according to the administrations of the department chairmen. These sections are further subdivided by academic years.

**Donald W. Robinson, Chair (1990–1992)**

Don Robinson came to BYU in 1956. He had earned BS and MA degrees at the University of Utah in 1948 and 1952 and his PhD at Case Institute in 1956. His specialty was linear algebra, much of his research centering on the structure of matrix rings over finite fields. He had also served as interim department chair in 1961–1962 while Harvey J. Fletcher was on leave.

**The Year 1990–1991**

Dr. Gill: The tenure of Professor Peter Crawley as chair (1978–1990) put the Department of Mathematics on a path towards becoming a major department of research and teaching. He kept the Mathematics Education Faculty in harmony with the Pure and Applied Mathematics Faculty. A considerable momentum was built by hiring top quality faculty that were available. His twelve years of administration mark the maturing of the Department of Mathematics. Professor Donald W. Robinson accepted the responsibility of continuing this momentum as the Chair of the Department of Mathematics for a couple of years.

Comments by the Chair:

Faculty: The Department invested a considerable amount of recruitment time in preparation for the 1991-92 academic year. Roger Baker and Gary Lawlor are coming as members of the permanent faculty; Thomas Brady has accepted a two-year appointment; Grigori Kolesnik, who will be on leave from California State University at Los Angeles, will come for the Fall Semester as a Visiting Professor; Denny Foscarini and John Bingham, who are high school teachers, will join us as Visiting Instructors. Michael Lundquist was granted permanent faculty status. Harvey Fletcher anticipates retirement in 1992. Ronald Jamison, currently on leave as a mission president, may wish to retire in 1993. William Smith was promoted to full professor in 1991. Don Snow was on leave the Fall Semester; Peter Bates was on leave the Winter Semester; Helaman Ferguson continued his personal leave. Wayne Barrett will be on leave in 1991 at the Institute for Mathematics and Applications and in 1992 at the Jerusalem Center; Hal Moore will be on leave in Cambridge, England, during the summer of 1992; Michael Lundquist in 1991 and Andy Pollington in 1992 will each have one semester internally approved and sponsored leaves. Helaman Ferguson will terminate his appointment at BYU on 31 August 1991. Andreas Stahel anticipates termination of his appointment in 1992. Royal Hurd and Denise Daniels return to their public school teaching appointments.
Assessments: It is anticipated that recruitment efforts during the coming year will be directed towards obtaining a suitable replacement for Stahel. It will also be necessary to identify at least two high school teachers, who are eligible for leaves of absence, to join us in 1992-93. Recruitment of some part-time people to teach during Spring/Summer 1992 will also be necessary.

In response to a request from the Graduate School, the Department prepared a Self Study for Graduate Council Review in November 1990. This document has been submitted to the Council. The Department anticipates further discussion on the issues considered in this study. The Undergraduate Committee has prepared a document that discusses three topics: The Entry-Level Program, the Undergraduate Major, and Support Facilities. This document was prepared in response to some concerns of the central administration. Although the faculty is not in agreement with every aspect of this study, it is hoped that a sufficient consensus will soon be reached so that the document may be forwarded. In response to an invitation from Doug Chabries, a report on computer needs for the Department has been submitted to his office. Also, in response to a recommendation from Robert Webb, a Program Improvement Request for Sustaining Funds for the Math Lab has been prepared; this proposal is submitted as a possible solution to the problem of dealing with the uncertainties of income received from the Evening School.

The Department expresses appreciation to the administration for the resources that have been provided to develop a computer network. We place high priority on the need to improve and expand this facet of activity. We have been able to obtain NSF money to enhance our graphics capability, and will continue to seek outside support for these efforts. A computer facility has recently been installed in the Math Lab. Software developed at the University of Arizona is to be used to supplement undergraduate instruction in mathematics.

The Department appreciates the permanent funding for our systems manager: Jan Peterson is performing very well. His responsibilities, however, are rapidly growing beyond the capabilities of one man. Lonette Stoddard has accepted a mission call: she will be sorely missed. Jill Fielding will assume most of Lonette’s responsibilities, and Gloria Larkin has joined our office staff. We hope that Lonette will be given a position on the Department staff upon her return from mission service. Finally, we remind ourselves and the administration that the department’s principal goal is to build a strong research and teaching department, staffed by working mathematicians. Thus, the concern of highest priority for the Department is to develop a strong faculty.

The Year 1991–1992

Dr. Gill: It is clearly seen that Mathematics Department had been a 'Foster Child' from 1904-1958 [because it was administered by physicists only] and in 1958 it was given to Harvey J. Fletcher, son of Harvey Fletcher, as Chair. In 1960, the Department of Statistics was created, from the Mathematics Department, with Howard C. Nielsen as Chair. In 1969, the Department of Computer Science was created from the Mathematics Department with C. Edwin Dean, a Numerical Analyst, as Chair. In year 2000, the Department of Mathematics Education was created from the Mathematics Department. I hope that this is the end of splitting the Mathematics Department.

In 1973, the College of Physical and Mathematical Sciences was created from the College of Engineering and Physical Sciences. I came to BYU in 1956 as a student to study Electrical Engineering. I took Engineering Mathematics from Harvey J. Fletcher and Abstract Algebra from Donald W. Robinson. I took Advanced Calculus from John H. Gardner of the Physics
Department. He said he was teaching this class because he wanted to review Advanced Calculus. I took Physics classes from Milton Marshal, John H. Gardner, Duane Dudley and several others. I had a double major in Physics and Mathematics. Harvey J. Fletcher and Donald W. Robinson convinced me to graduate in Mathematics and encouraged me to go to the University of Utah to get a PhD degree. They were my first mentors in Mathematics. As a result, I have been associated with the Mathematics Department since 1956. I pay tribute to Harvey J. Fletcher at his retirement.

Comments by the Chair: After many years of devoted service to BYU, Professor Harvey J. Fletcher retired, effective September 1992. Kent Bessey accepted a position at Ricks College. As a result of successful recruitment efforts, these positions are being filled by Tiancheng Ouyang and Gregory Conner; both come as Assistant Professors. Denny Foscarini will continue with the Department another year; John Bingham is to be replaced by Samuel Blackham, and Anne Crosland is to fill a one-year appointment in 1992-93 as a Visiting Instructor. Ronald Jamison, currently on leave as a mission president, plans to return to service to the University in the fall of 1993.

Support for a Special Year in Nonlinear PDE’s was approved by the administration for 1992-93. The Department will host several distinguished visiting faculty and short-term visitors. Nonlinear Functional Analysis and Bifurcation Theory will be taught by Distinguished Visiting Professor E. Norman Dancer of Armidale, Australia; Partial Differential Equations will be taught by Distinguished Visiting Professor Peter Hess of Zurich, Switzerland; and the Theory of Ordinary Differential Equations and Dynamical Systems will be taught by Visiting Assistant Professor XuYan Chen of Georgia Tech.

Visitors for the fall of 1992 include David Olsen of New York University and Klaus Schmitt of the University of Utah; for the winter of 1993, Xinfu Chen of Pittsburgh and Toshiyuki Ogawa of Hiroshima, Japan. Other visitors include N. Alikakos (Crete and Tennessee), Shui-Nee Chow (Georgia Tech), Giorgio Fusco (Rome), Chris Grant (Georgia Tech), Jack Hale (Georgia Tech), Chris Jones (Brown), Robert Kohn (NYU), John Mallet-Paret (Brown), Hiroshi Matano (Tokyo), Wei-ming Ni (Minnesota), and Yasumara Nishiura (Hiroshima, Japan).

Wayne Barrett completed a very successful academic leave in Minnesota and in Jerusalem, Israel. Michael Lundquist enjoyed a leave at the Institute for Mathematics and Applications in the fall of 1991, and Andrew Pollington completed a productive leave during the Winter Semester of 1992 in Australia working with William Moran.

The following leaves have been approved: William Lang will work at the Mathematical Sciences Research Institute in Berkeley, California during the academic year 1992-93. Robert Speiser will be at MSRI during the fall of 1992 and in Europe during parts of the winter of 1993. Louis Chatterley is to work in mathematics education with Donald Peck at the University of Utah. Andreas Stahel will spend the year in Switzerland.

Robert Speiser has accepted an appointment as an associate dean in the College of Physical and Mathematical Sciences. His appointment was effective 15 May 1993.

15 August 1993 the new Chair of the Department of Mathematics will be Peter W. Bates. He will be assisted by Gerald W. Armstrong as Associate Chair and Jacqueline Taylor-Ortega as Assistant Chair. Donald W. Robinson and Louis J. Chatterley will return to the classroom.
Peter Bates, Chair (1992–1994)

Peter Bates earned his BS degree at Queen Mary College, of the University of London, England, in 1969, and his PhD at the University of Utah in 1976. He joined the BYU faculty in 1984. His specialty was nonlinear partial differential equations. We had a brief conversation one time with Peter about teaching algorithms versus teaching creative thinking. At the end of the conversation, Peter was asked how he would define creative thinking. After a moment’s pause, he said, “It’s the spontaneous generation of algorithms.”

The Year 1992–1993

Dr. Gill: I want to thank Peter Bates, Kening Lu and Paul Fife for getting me excited about mathematics research. I was happy teaching large number of hours and large classes because I enjoyed teaching very much. However, Peter’s enthusiasm about mathematics research was contagious. I got involved in his seminars and tried to get Paul Fife to come to BYU from the University of Arizona. However, Paul went to the University of Utah instead and I attended many of his seminars there. I even took a Sabbatical leave and spent time with Paul Fife at the University of Arizona and Heriot-Watt University in Scotland. Peter Bates and his collaborators were more like a family than just friends. I went to serve a mission in Bangalore India in January 1993 and returned in August 1995. Robert Speiser was Associate Dean with Grant Mason as Dean. In 1993, Bill Evenson from the Physics Department became the new college Dean. In 1994, Bill R. Hayes from the computer Science Department became the new Dean of our College. In May 1994, Peter Bates was informed that he would be replaced by Gerald M. Armstrong as Chair of the Mathematics Department. When I returned in August 1995, I was shocked to learn of his abrupt dismissal as Chair. A few years later, it was hard for me to see us lose him, a world-renowned mathematician, to Michigan State University as Chair of their Mathematics Department. I am delighted that Kening Lu decided to stay with us to this day. I want to thank Peter Bates, Kening Lu and Paul Fife for their help to me personally. They have been an inspiration in my personal life.

Comments by the Chair: This has been an interesting and exciting year, not only because I have been learning a new job and have stumbled through several crises, but also through the efforts of our faculty and staff and the support we have received from the administration.

When we began our recruitment efforts we knew of only one Visiting Assistant Professorship to replace Andreas Stahel, and two Visiting Instructorships for the coming year. However, because of our well-documented need for more faculty, the availability of some strong LDS mathematicians and the forceful report written by the Mathematics Education Committee, Dean Evenson and Vice President Clayne Pope transferred three positions to the Department until the next retirements. This has allowed us to hire Steve Williams (Mathematics Education, Washington State University), Chris Grant (PDE’s, Georgia Institute of Technology) and David Clark (Number Theory, University of Essen) into tenure-track assistant professorships. This is in addition to Kenneth Kuttler (PDE’s, Michigan Tech. University), who will occupy Andreas Stahel’s position next year, and Steve McKay
(Numerical Analysis, University of Houston), who is replacing G. S. Gill as he serves as Mission President in India. We have also been able to hire Micah Wheatley as a Visiting Instructor. Micah will continue to oversee the operation of the Math Lab and will also teach in the Department.

Denny Foscarini, Sam Blackham and Anne Crosland will be leaving us and deserve all our thanks for the excellent contributions they have made to our department. Joining us next year as Visiting Instructors will be Doug Richards (Bingham High School) and Duane Young (Murray High School) and we look forward to working with them. Bill Lang will be back after a successful Professional Development Leave at MSRI, Berkeley. Bob Speiser is also back in the Department after a year in the Dean’s office and some time at MSRI. Louis Chatterley will return from his Professional Development Leave but will continue the research he initiated with Donald Peck at the University of Utah. Ronald Jamison returns after a three-year leave serving as mission president in the Dominican Republic. Steve DiPippo leaves us after three years as Jamison’s replacement, during which time he collaborated on several diverse research projects with other members of the faculty. We will miss his stimulating contributions but wish him success with his future plans.

Roger Baker has accepted an invitation to visit the Institute for Advanced Study, Princeton, during the fall of 1993 and has been granted a Professional Development Leave from BYU. Ovide Arino (University of Pau, France) will occupy Roger’s position during the Fall Semester and will collaborate with Bill Smith. During Winter Semester 1994, Janos Pintz (Hungarian Academy of Sciences) will take a Visiting Distinguished Professorship in our Department to collaborate with members of the Department and to teach a class in analytic number theory. We are delighted to have Lonette Stoddard back with us after her mission in London, England. Her jovial nature does not appear to have been subdued and her enthusiasm is a boon to us all. We appreciate the service, which Gloria Larkin gave to our Department, filling in for Lonette, and wish her well in her future endeavors.

The Special Year in Nonlinear PDE’s, supported mainly by the administration, was an outstanding success with almost thirty long or short-term visitors who gave seminar talks and collaborated with faculty and students in the Department. The year, however, was marked by the tragic accident that took the life of Peter Hess (University of Zurich) who was a Visiting Distinguished Professor during the Fall Semester. We who were his colleagues and students feel the loss acutely.

This year marked the graduation of the first two PhD students in Mathematics from BYU. Jian-Ping Xun wrote his dissertation in the area of nonlinear PDE’s and has accepted a two-year postdoctoral appointment at Georgia Institute of Technology. Eric Swenson wrote his dissertation in geometric group theory and has accepted a Visiting Assistant Professorship at Michigan Tech University. We are pleased with the progress made in implementing our PhD program and with the respect it enjoys nationally.

In the coming year we have several challenges which face the Department. Among them is the evaluation of several experimental approaches to the teaching of calculus with the goal of producing a highly effective and efficient curriculum and method of instruction. At the same time we hope to develop a lively and relevant pre-calculus course, which will become a GE
requirement for BYU. Furthermore, we will follow through with the complete evaluation and adjustment to the entire curriculum in Mathematics that was begun this year.

As the Department and its faculty continue to gain respect, we notice an increase in the number of external awards we receive. These include grants for personal research, equipment, conferences, and curriculum development. The strength of our faculty suggests that even in these lean years we will receive more awards. External grants are important but more important is the general productivity and intellectual life of the Department, which also continues to improve. The primary goals of the Department are, of course, to strengthen the teaching effectiveness and scholarship of our faculty and to develop a unity of purpose and congeniality that will prompt us to contribute to one another’s success. We look forward to a year of progress towards these goals.

The Year 1993–1994

**Dr. Gill:** During Peter Bates short tenure, the Mathematics Education Committee made a strong recommendation to split the Mathematics Department to create a new Mathematics Education Department. This proposal had been discussed many times before but each time it was decided that the time was not right. Robert Speiser, Gerald Armstrong, Charles Walter, Gary Lawlor, John Paterson, Ted Wight, Lou Chatterley, Steven Williams and others were in favor of this proposal. The College Deans, the University Curriculum Committee and the Central Administration began the process to evaluate this proposal in earnest. The Department Internal Study, Dean’s Evaluation of the Department, External Departmental Review, faculty interviews, student interviews and many meetings with the administrative units were all used to come to a decision. This process took about six years and finally in July of 2000 the Mathematics Education Department was formed. Four mathematicians and four mathematics educators became the new faculty of the Department of Mathematics Education. This faculty would teach about 35% of the regular Mathematics teaching load. This arrangement continued until about the year 2010 when both departments were given sufficient resources to take care of their needs. This kind of arrangement is not without precedent. When Computer Science Department was split from the Mathematics Department, at least four of the parent Mathematics Department faculty eventually joined the new Computer Science Department faculty. Both departments are now stronger after the separation, because the administration is now committed to make both departments the best they can become.

**Comments by the Chair:** From my perspective I must say that the faculty of the Department of Mathematics are impressive in their dedication and work towards furthering the goals of this department and BYU.

The various committees were very effective in moving us forward in several directions. In particular, the Curriculum Committee did an outstanding job of examining and revising the entire undergraduate and beginning graduate course structure. The innovations will better serve not only our majors, but also the large numbers of students from departments across campus who take courses in this department. The Mathematics Education Committee has also been involved in this curriculum revision, specifically with regard to our MA degree. Our Undergraduate Committee implemented the first phase of our plan to advise mathematics majors more effectively by sending personal invitations to all freshmen to meet with a designated advisor. With over 500 undergraduate majors, the challenge of giving personalized guidance is great but our faculty are prepared to meet that challenge. The
Teaching Committee has taken its responsibility seriously and expanded upon its initial mandate when additional needs were perceived. The teaching evaluations of junior faculty afforded by classroom visits by their colleagues has been helpful in building teaching files and in stimulating discussions about effective teaching. More will be done to evaluate teaching and to foster the sharing of successful instruction techniques in the coming year. The Graduate Committee has completed a graduate student handbook, which provides important guidance to our Master’s degree and PhD candidates. The Committee has also worked with the Curriculum Committee in designing beginning graduate courses and in making the transition from undergraduate to graduate curriculum seamless.

In addition to the work of committees, faculty members have taken the lead in several other valuable initiatives. Among them are: the development of an extensive Teaching Assistant workshop, two experiments with different approaches to reformed calculus utilizing computers, and the development of software and syllabi to be implemented as new General Education pre-calculus and beginning calculus courses. The latter is made possible partly through two generous equipment grants from Hewlett-Packard. Through a partnership including the Faculty Center and the Dean of the Graduate School, we were involved in a pilot program of “mentoring trios.” Each of the three trios consisted of a senior distinguished teacher, a junior faculty member and a PhD student. Each visited the classes of other members of the trio and discussed their observations. Goals, which were partially realized, included improving congeniality among faculty and graduate students, teaching development through cross-fertilization of ideas and techniques, and evaluation and positive criticism of current teaching practices. In the coming year we will continue with this program.

Another success that should not pass unnoticed, though success here has become a tradition, is that of our Putnam team, which placed 35th in the National Undergraduate Mathematics Contest. This was in a pool of 300 teams representing almost all universities in North America.

In the area of scholarly activity the department has performed admirably. More research publications authored by our faculty appeared last year than any previous year and the same holds true for the number of manuscripts submitted, indicating an accelerated growth in our research strength. To complement this we had a significantly greater number of proposals submitted for external support. Even in the well-documented dearth of federal funding for mathematics, more than half of all NSF grants in the College are held by mathematics faculty. We continue to receive an increasing number of invitations with support to speak at other universities and national or international conferences and BYU’s stature amongst the mathematics community of the world has grown accordingly.

This report would not be complete without a mention of obstacles in the way of our goal to become a first-rate department, though we have made much progress over the last decade. Faculty morale, in my opinion, despite the efforts and successes outlined above, has never been lower than it is now. This is partly due to the fact that some of those who should cultivate the proper environment for good science fail to recognize or appreciate the remarkable accomplishments of this department. It has been further aggravated by the perception that faculty and their opinions are not appreciated by some in the administration. While this perception is ill founded in some cases, I would encourage the administration to
work to correct this impression and seek to discover the treasure that lies within this department.

**Gerald M. Armstrong, Chair (1994–1997)**

![Gerald Armstrong](image)

**Gerald Armstrong** was a graduate of BYU, having received BS and MS degrees in 1963 and 1965. He earned a PhD from the University of Wisconsin at Madison in 1971. He joined the BYU faculty in 1970. His research interests were in analysis of gauge integrals and later with calculus pedagogy. During his service as chair, he also served as a stake patriarch.

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**The Year 1994-1995**

**Comments by the Chair:** We have several major accomplishments to report over the past school year. A great deal of time was spent working on the Self Study; all of our faculty participated in the writing and rewriting of this document. It gives many reasons why we can be proud of our department.

Our research accomplishments continue to increase. We published more papers this year than ever in the past. The quality was excellent. One paper by Jim Cannon, published in *Acta Mathematica*, is likely the best single research effort by a BYU Mathematics professor ever. Another faculty member, Chris Grant, received an NSF research grant. Our graduate program continues to strengthen, especially the PhD program, with excellent students, demanding courses, and devoted teachers and mentors.

In teaching, we continue to work to improve calculus as we participate in the nationwide calculus reform movement. Math 119 (Short Calculus) has been placed under the Harvard Calculus program, which seems natural given the many applications provided by this course in business and biology. We continue to put considerable effort into improving teaching by our teaching assistants, giving them more instruction and closer supervision. The TA workshop run by Jackie Taylor-Ortega was conducted again this year. Math 190 (Fundamentals) continues to develop as an important course for our students. Math 315-316 has become part of an effective analysis program for our majors. Teaching generally receives devoted attention from the faculty, with student needs receiving care.

In terms of life in the department, for some of our faculty just getting through the past year seems like a major accomplishment. A quotation from the Self Study indicates frustrations felt by some:
A source of frustration for the Department is the dissonance between how it perceives itself and how it seems to be perceived by the administration. Mathematics views itself as one of the most improved departments in the University—one that has moved from a service department to a PhD granting department with some standing in the mathematical community, one that includes several internationally known scholars and has eleven of its members supported by National Science Foundation grants. It has made some careful comparisons with other mathematics departments across the country and believes it compares very favorably with those ranked between 60 and 82. Yet it appears to members of the Department that the administration ranks Mathematics at the bottom of the College.

Some members of the Department have been told that “there are widely held perceptions” that “Math isn’t interested in teaching,” or that “Math isn’t interested in hiring Mormons.” When they have inquired about these comments, they have received no useful responses. Where do these “widely held perceptions” come from? Why do they persist when the facts so easily demonstrate that they are false? The hope is that most of the faculty realize by now that general support for the department and its programs remains very strong among administrators. Our aim, I believe, should be to keep immersed in our research, teaching, and other combined department efforts, and allow our image to naturally improve. The progress being made in research is in line with department goals as expressed on page 2 of the Self Study report:

Since no mathematics department can cover the entire mathematical spectrum, a number of years ago the BYU Mathematics Department agreed to concentrate on a few areas that would represent the three main branches. Presently, the Department has working groups in Algebraic Geometry, Geometric Group Theory/Topology, Matrix Analysis, Number Theory, and Partial Differential Equations/Dynamical Systems. Both the Topology and PDE groups have supervised graduate students to the completion of the PhD degree. The Matrix Analysis group presently has two graduate students who likely will complete the PhD. Some of these groups are involved with other disciplines across the campus. The PDE group, for example, is involved with materials scientists, engineers, and physicists in a program of study related to phase transitions. Some of the members of the Number Theory group have been working with electrical engineers and computer scientists on wavelet analysis and signal processing. The research groups are generally very strong. For example, in terms of refereed publications, Number Theory had 6 papers last year, PDE had 7, while topology had 5. Also, PDE and Topology were very active in seminars.

Further comments in the Self Study relate to Mathematics Education:

The Department also has a strong commitment to mathematics education, reflected in the fact that about half of the Department’s 500 undergraduate majors and 40 or so master’s degree students pursue mathematics education degrees. A sixth group of faculty members in the Department, the Mathematics Education group, focuses its professional work on the issues surrounding the teaching of mathematics. Several other mathematicians in the Department have begun collaborating with the Mathematics Education group on the problem of how students from grade school to college learn mathematics.

The strength of this expressed commitment to math education has been questioned by many faculty members over the past year. Feelings regarding math education are so strong that, in fact, a few members of the department question whether math education is entitled to be regarded as a legitimate faculty group.
BYU is a major part of the calculus reform movement, with 3 current NSF participation grants. There is some expressed opposition to reformed calculus in the department. This year we will look for statistical evidence of progress in this area. Nationwide, as well as here at BYU, the reform movement is spreading both upward and downward (to higher and lower level courses).

We have had considerable evidence of collegiality in the department, with cooperative interchange between the faculty members. There are areas, however, where improvements along the lines of President Hunter’s dictum of treating each other with more kindness, more courtesy, etc., are needed.

For the next year, we are working on student advisement in the department. Just over a year ago, an organization was set in place for this purpose. The number and diversity of the faculty involved together with the large number of students made it impossible to track them effectively. We are currently working to revise this.

Another challenge for next year is to undergo an external review of the department, which is scheduled for October. This should have a considerable effect upon our direction and goals.

There are some additional items that should be mentioned. Wayne Barrett received two teaching awards. Lou Chatterley also received a teaching award. Don Robinson received an MAA service award. Vencil Skarda coached the Putnam team to another remarkable performance. More details on these accomplishments were given above. Special funding, in the amount of $18,600, was awarded to Bob Speiser and Chuck Walter by the Faculty Center, for research and course development in math education. Nominations were presented to the University in behalf of four of our faculty for Maeser awards. In addition, Jacqueline Taylor-Ortega serves on the Freshman Orientation Committee in the university. After many years of service to BYU and the department, Hal Moore retires this summer. He will be missed.

Our goals for next year will be to continue efforts in scholarship and teaching. We must work for a more unified and cooperative attitude in the department. Particularly, unity within the mathematics education group now seems to be increasing, and more understanding and cooperation between math education and the rest of the department must be bolstered. Overall, my judgment is that the most important responsibility we have next year is to discuss and vindicate the legitimate role of mathematics education in the department. We must accomplish this with cooperation and respect.

The Year 1995–1996

Comments by the Chair: Major events in the 1995 history of the Mathematics Department center on our self-study and our external and internal reviews. We completed our Self-Study in April, including the Analysis of Educational Programs and Their Effectiveness, and Evaluation and Aspirations. While there was some dissatisfaction among faculty with some items in these documents, there was nevertheless a general feeling of accomplishment that we were able to come together as a department to complete these.
We found out in October that the Self Study committee and Vice-President Alan Wilkins were not entirely satisfied with our self-study work. Jim Kearl, chair of the self study committee, and President Wilkins informed us in a department meeting that they would be asking our reviewers questions about 1) the PhD program, 2) math education, and 3) calculus. They wanted further information to be used to make recommendations for the department.

Our external review, after careful planning with the administration, occurred October 30 to November 1, with the review team of prominent mathematicians John Garnett, William Jaco, and Morton Lowengrub. They not only met with department members, but with students, representatives of the graduate school, and college and department administrators. Later, in the middle of November, a team consisting mostly of BYU Graduate Council members conducted an internal review of the department. We greatly appreciate the efforts of these reviewers. After some time (February 12, 1996), we finally received a review report from the graduate council, which included the external review as well. The Department Review Report is attached to this annual report. I will categorize my remarks in terms of research, teaching, and citizenship.

1. Scholarly Productivity. Because the first part of this report is the Annual Report of Scholarly Productivity, this item is discussed first. In terms of scholarly productivity, our department is doing very well indeed. There were 31 peer-reviewed papers and articles that appeared during 1995, compared to 25 in 1994, and 21 in 1993. There seems to be a steady upward trend in this important measure of department accomplishments.

There are several items, taken from the Department Review Report, which received strong emphasis from department evaluators. Positive comments were made about our emphasis upon strong research groups. They describe the department as having excellent, hard-working faculty, with excellent monitoring of students at all levels. They recommended continuing our strong PhD program at current levels. Some reasons given for their support include the strength of the program itself, how it helps in preparing students to join our faculty in the future, the very positive influence upon our faculty and their teaching of undergraduates, the extra care which our Math 110 students receive from graduate student TA’s, and the general need to provide students at BYU with a best possible educational experience within a department with a strong research interests.

We emphasize conclusions given in the report about the quality of the PhD program and its students; namely, that it would rank about 80th among over 200 doctoral programs in the nation. This is impressive, especially given the relatively short time we have had this program. We are grateful to see such a high rating of this vital program, and intend to build upon such successes. There are some needs for the future that deserve mention. We intend to continue careful hiring practices, looking for excellent teachers as well as those who can make significant contributions to department research groups. This is especially important as faculty retirements continue—we project two retirements next year, with an average of one to one and one half per year over the next several years. We intend to continue encouraging professional development leaves for our faculty. We have a goal of keeping positions available for visitors to the department. These visiting faculty not only contribute to our department research and teaching missions, but they spread our influence further into the mathematical community. We need continued support in terms of research, travel, and
seminar funds. We have a strong need for additional computer support, both in terms of facilities, more money for software, and particularly for computer service representative in the department.

2. Teaching. The Mathematics Department is very concerned about teaching. We have used the teaching partnership program, sponsored by the Faculty Center, each semester since its inception. We require student evaluations for each faculty member each year, and each semester for untenured faculty. In addition, classroom visits to faculty classes by colleagues is encouraged for all, and required for non-tenured persons. A great deal of informal mentoring takes place as well. Teaching quality considerations make up one-third of the total merit raise decision for the faculty. Our faculty is in general very concerned that all our students have positive learning experiences in all our classes.

Department review teams also point out that our faculty is very concerned about quality teaching at every level and that the faculty are willing to take varied assignments. We purposely try to give our teachers wide teaching experiences. The review points out that we need more careful mentoring of TAs (although current TA instruction is well done, with few complaints). We intend to vigorously pursue this goal. The reviewers also suggest we look carefully at calculus. They also suggest we hire carefully in math education, which is now happening in the department; as of this date we have, by a strong majority, agreed to proceed with one such hire. It was recommended that the MA in Mathematics Education, the only program with serious difficulties be reviewed carefully to see whether it should be improved and allowed to continue.

A further word on calculus is needed. A movement to reform calculus has achieved considerable momentum nationwide and beyond over the past few years. Our department is contributing strongly to that by writing articles, participating in conferences, and particularly participating in three NSF funded proposals for the past three years. These proposals called for experimentation with two reformed calculus programs, and comparison with traditional calculus. These grants expire as of winter 1996. We were challenged to sort out the calculus situation in the department. We have had a couple of preliminary evaluations of these reformed courses, but then, due to the self-study, have been unable to continue to use Institutional Studies until last semester. Results of a further study will soon be available. Several other studies are in the mill as well. We are committed to give our students the best calculus preparation we can. The external reviewers recommended we use technology in all our calculus courses, and that we use the honors sections to teach a rigorous math-majors type course. We are working for department consensus on how to best present this vital university course to our students. There are vital needs in connection with our teaching role at BYU. A strong recommendation for calculus is that we work towards small sections. This move will involve significant resources from the administration.

There is a need to upgrade the Math Lab as well. More tutoring for higher-level undergraduate classes is needed, which will require more student assistants. The location of the math lab needs to be closer to the TMCB. The math lab administrator position should be made permanent. We project that we will need another student computer lab within five years. We have other serious space needs as well. TA offices, which currently have three persons in each small office, should only house two students. A special room with adjacent
storage space for teaching aids, and tables for groups of four students, is needed for effective math education courses. We have a strong need for an electronic classroom as well.

3. Citizenship. We have had considerable difficulties and conflicts in the department within our own numbers. The department review lists as its first recommendation the need for concentrated efforts to improve collegial communications and interactions among the faculty. It then lists some suggestions to assure that this will happen, which we are taking very seriously. The next two recommendations ask for mutually respectful relations with college and central administrations. The reviewers encourage administrators, as well as department members, to work to establish better and more open communications. Suggestions are also given in the review report concerning how the chair must insist that department members relate in a collegial manner with one another.

There is clear evidence that relationships within the department have improved over the past few months. There seems to be improvements in relations between the department and administrators as well, although some recent announcements have caused considerable worry for some. The recommendation by the review teams that we do not form a new department for math education has been well received, based upon the belief that math education will be respected as a research as well as a service area in the department.

Some needs and goals that were not mentioned above follow. We are aware of the need to move ahead despite any past difficulties; we hope that we will receive administrative support to do so. We are concerned about our staff personnel. The self study report pointed out that advancement opportunities for BYU staff are generally very limited. This is especially true if a staff member wishes to remain in their present position. We are just now losing our CSR largely because of inadequate opportunities for advancement. We recommend that our two secretaries be allowed to work on a near-equal basis, regardless of university policy that works well in other areas. There need to be better opportunities for advancement and better funding for these devoted staff persons. In addition, we point out that our supplies budget is entirely inadequate. Several items have been added to our already limited budget, which we must pay for without a suitable increase in funds. Increased software needs and prices have been overpowering. We have asked for increases in this budget for at least the last three years, and the need today is greater than ever before.

RETIREMENTS:

Hal Moore (30 June 1995) After 34 years of service in the Mathematics Department, Hal G. Moore retired on 30 June 1995. He was honored by his friends and colleagues at a dinner in the Skyroom on 13 September 1995. Hal served faithfully and well, working on many committees both at the department and university level. He was a productive researcher, authoring 19 publications on abstract algebra and 5 textbooks on calculus, college algebra and linear algebra. He will be sorely missed and we wish him well.

The Year 1996–1997

Comments by the Chair: Major events in the Mathematics Department during 1996 include hiring, clarifying departmental roles and responsibilities, and continuing negotiations with the administration relating to issues arising from the self study and the department review. We were fortunate to hire two young faculty members, Tyler Jarvis and Blake Peterson,
during the year. These two colleagues are already making significant positive contributions to the department. We hope to be able to continue to add new faculty of quality similar to those in the future. We had one faculty member, Lou Chatterley, retire after many years of devoted service to the department and the university.

We have spent considerable time working together as a department to move beyond past difficulties. G. S. Gill, as the new associate chair, has aided greatly in opening opportunities for all department members to communicate with each other and to contribute to the department. In a meeting with the department on 12 July 1996, we were asked by President Merrill J. Bateman and Academic Vice President Alan L. Wilkins to respond to some concerns that they expressed, which had arisen from recommendations in the departmental review. We met weekly for most of fall semester to provide a unified response to their questions. This response is copied as an appendix into the present annual report. The main points which needed departmental consideration were governance, including living together collegially in the department, fostering excellence in teaching, especially during the freshman year (which means in calculus), hiring, and the future of mathematics education in the department.

To meet the need for all to be involved in decision making in the department, the advisory committee to the chair has been expanded to include not only the chair and associate chair, but also representatives from major segments in the department. The membership currently includes Wayne Barrett, Peter Bates, James Cannon, Peter Crawley and Steven Williams. It is intended that every faculty member have someone on this committee with whom they feel comfortable communicating. So far, it seems that this protocol is working very well indeed.

Comments on teaching and our particular goals related to calculus will be discussed below. Details of our plan to continue to hire outstanding faculty may be found in the document in the appendix. We have spent considerable time with lively discussions about the role and position of mathematics education. There are still goals to be realized in this area. The math education group needs to be well defined, their responsibilities clarified, and their goals broadly unified. Currently, the department has expressed agreement that this group will form one of the research areas in the department. The extent to which they will be able to expand their numbers, or the MA program, or direct other math education related responsibilities in the department, has yet to be agreed upon. Preparing future teachers is projected to be one area of emphasis in the university. Thus we have the need to assume our proper departmental position in such training, in cooperation with those whom the administration has charged to oversee this role.

1. Scholarly Productivity. This item is discussed first, since the first part of this report is the Annual Report of Scholarly Productivity. The actual number of peer-reviewed papers went down a bit from the last two years, to 20 papers written by 15 departmental authors in 1996. Because articles appear irregularly, however, this is not a cause for alarm. Our average over the past four years is more than 24 papers per year, which is entirely consistent with other departments ranked about the same as we are. We were ranked at about 80th in the nation by our recent external review, in terms of a research entity, which gives us an enviable position in the college and university. We feel justifiably proud of this high ranking, and hope university administrators share this feeling of accomplishment.
Our department review report commented about several areas where our research efforts were particularly successful. We intend to continue to support our established research groups and to maintain and hopefully improve our research status, and to continue to provide excellent monitoring of all our students. In addition, we intend to follow the reviewer’s recommendations that we maintain our PhD program at about the present size and that we continue to seek for excellent graduate students who will not only receive a strong educational experience but also be able to develop skills as teachers. We see a clear need to provide all our students with a best possible education that can be done within a department with strong research interests.

We intend to continue our careful hiring practices, seeking for excellent teachers as well as those who can contribute to our research groups. This is very important as faculty retirements continue. We project from 1 to 2 retirements per year for the next 10 years.

We are pleased with the support we receive for professional development leaves within the department. Not only does this build those who take leaves, but it also provides positions for visitors to the department. We are grateful that the Nonlinear Analysis Laboratory is now fully functional as a formal research organization in the department, supported by the administration. This laboratory not only facilitates research in nonlinear analysis within the university, but also brings outstanding visitors to BYU. We had six visiting faculty during both winter and fall semesters. These colleagues do research with our faculty and are outstanding teachers for our students. We are fortunate to have such visitor programs.

We greatly appreciate the support we receive for our research efforts. While we feel greatly blessed, we hope to obtain needed increases in our college research funding, travel budget, funds for colloquia and seminars, and in capital equipment and software budgets. An additional, constant need in the department is for more computer service support.

2. Teaching. Because it is so much a part of our university life and goals, we sometimes fail to consistently emphasize our determination to fulfill our teaching mission at BYU. We are very concerned about good teaching in the math department. We require teaching evaluations for all faculty yearly, and for untenured faculty or visitors each semester. In addition, the teaching committee arranges visits to untenured faculty classes each semester, and to other teachers as requested. We do a great deal of mentoring as well. Our faculty have been divided into mentoring groups by our teaching committee, with visits arranged between classes and discussions of pedagogy. One-third of the amount of merit raises is based upon evaluations of teaching. We have participated in the faculty center teaching trios program from the outset, and receive great benefit from this. In addition, we have invited our new faculty to participate in campus wide informational programs to aid them in becoming excellent BYU teachers.

In addition, we are working with our teaching assistants to make sure that they teach well. We had a pre-school TA conference in August to prepare them for their teaching assignments. In addition, the teaching committee is directing teaching seminars where faculty and teaching assistants take turns presenting material. We feel this will be helpful to both groups of teachers. We have a goal to continue efforts which the reviewers were complimentary of; namely, that we all teach students at every level, and so agree to varied
teaching assignments, and that we seek to build our mathematics education contingent through careful hiring.

We are working as a department to improve our calculus instruction for freshman students. We have submitted a program improvement request for more faculty in order to allow small sections of calculus. We have received tentative acceptance of that proposal, with a commitment to obtain two temporary slots for fall 1997, so that our faculty will be able to teach at least four additional small sections of calculus. We are very pleased that the administration recognizes the need for improved calculus instruction.

In addition, we have organized to improve all calculus taught in the department. We have agreed on a departmental part to all calculus final examinations, which will encourage a common core of materials. We are considering what the proper honors calculus course should include. We are involved in the current nationwide consideration of the role of “calculus reform.” Many of our faculty have been heavily involved in the reform movement, and thus many in the department are convinced that reformed calculus has a legitimate place at BYU. Others think we should continue with traditional calculus instruction. Thus far, statistics allow either position—students in either program do as well—and no worse—than those in the other program, when comparing grades in courses subsequent to calculus (also, there is no difference apparent when students change from one program to another). It appears that by defining a common core of material, we will be able to teach calculus from either standpoint, depending upon the preference of the individual teacher, and still fulfill our calculus mission. Our reviewers recommended using appropriate technology, whichever approach was taken for calculus, which is not currently done in traditional calculus. Also, the National Council of Teachers of Mathematics requires technology (graphing calculators) in their standards; it appears we will have to advise all our BA students to enroll in calculus classes where such technology is incorporated.

We have a significant need to upgrade our Math Lab as well. This has long been recognized by the department and was recommended by the reviewers as well. While we are generally able to adequately meet calculus and pre-calculus tutoring needs, we need more tutoring for higher-level undergraduate classes, which requires more funds for student tutors. Last September we submitted a comprehensive space needs document to the administration. We are hoping that as campus construction continues, we will be provided with an expanded math lab, with additional computer facilities, and be moved closer to the TMCB. We also submitted a program improvement request to have more of our student computers placed on the student replacement list, to keep up with increased demand. In addition, the Math Lab Administrator position has been temporary for five years, and needs to be made permanent (this was also a program improvement request).

Our space needs document includes other recommendations which are essential for good teaching. We ask for more faculty offices, as even our visitors have to share offices from time to time. Receipt of additional slots for teaching calculus will necessitate even more offices. The office situation for our teaching assistants is deplorable. Often three TAs are housed in a single small office, with far more students coming during office hours than the rooms can accommodate. We have asked for improved facilities for teaching math education courses as well. We need rooms that have tables and chairs, plus storage cabinets for class manipulatives. It appears hopeful that space management will be able to satisfy this need.
with two rooms in the SFLC for next fall. We also projected a need for an additional student computer lab within 5 years, and we have asked for an electronic classroom as well.

3. Citizenship. The conflicts within the department have significantly decreased. As mentioned above, there has been a concerted effort to broaden participation in the governance of the department. We have worked together productively to prepare a response to the administrative concerns related to the department, which required many meetings and a significant cooperative effort. Almost all of our faculty have made individual efforts to be more congenial and respectful of their colleagues. We are working very well together at present. Although strong differences of opinion are evident on nearly any topic, it is my judgment that we are showing respect for everyone involved and are able to disagree without being disagreeable.

It appears that when we receive a “response” (to our “response”) from President Wilkins, we will be ready to align our goals and procedures with those of the university. All our faculty will be happy to move beyond the difficulties of the past and also be done with the negotiation iterations arising from the self study. We will pursue goals common to us and the administration, and demonstrate to them that we continue to be devoted citizens of the university and trusted colleagues. We hope that we can undertake another external and internal review in about the year 2000, five years from the last one, to certify to the progress we have made as a department.

We are extremely fortunate to have our excellent staff to serve the department. Jim Logan, CSR, Leri Smith, administrative assistant, Jill Fielding, department secretary, and Lonette Stoddard, technical typist, are simply wonderful coworkers; we have difficulty visualizing how things could be better. Visiting faculty, as well as our own associates, frequently comment on how fortunate we are to have such a superior staff. They deserve support from the university as well. We hope that the heavy load they carry with our large numbers of faculty and teaching assistants, and our many students, will be taken into consideration with raises and advancement opportunities. In particular, Jill and Lonette share office responsibilities on an equal basis, and Lonette’s status and wages should be upgraded to correspond more closely with those of Jill.

Finally, it should be mentioned that we continue to need help with our supplies budget. We submitted a program improvement request that pointed out our critical need for more funds in that category.

RETIRED:

Louis Chatterley (1 September 1996) After 34 years of service in the Department of Mathematics, Louis J. Chatterley retired on September 1, 1996. Lou has been a strong advocate for mathematics education in the department throughout his career. He has been a goodwill ambassador for the math department in the public schools, working frequently with teachers there in terms of student teaching and providing workshops. He has been very active in the Utah Council of Teachers of Mathematics, the local affiliate of the National Council of Teachers of Mathematics, even serving on the Executive Board. We wish him much happiness in this new stage of his life.

Wayne Barrett received his BS degree from the University of Utah in 1968 and both MS and PhD degrees from New York University in 1975. He joined the BYU faculty in 1980. His specialty is linear algebra, matrices, and graph theory. When Wayne became chair, a friend told him, “Be of good cheer; each day will be better than the next.”

The Year 1997–1998

Dr. Gill: The time between August 1994 and August 1997 was very stressful for the Department of Mathematics. The Department Self Study and the External Review Committee outlined the strengths and weaknesses of the Department. These reports highlighted the lack of trust between the BYU Administration, College Deans, Department Administration, and the Department Faculty. The flash points were the abrupt dismissal of Peter Bates as Chair in 1994, appointment of Gerald M. Armstrong as Chair with little input from the faculty in August 1994, evaluation of teaching and research for salary and advancement purposes, viability of Mathematics Education Research and off-campus mathematics education programs, proposal for separating Mathematics Education from the department, polarization of the faculty, and the lack of constructive communication between the administrative units. The original reports and the subsequent responses are attached to the 1995 and 1996 Annual Reports. These are too long to be included in this history. These issues continued to be dealt with under the Armstrong, Barrett and Garner departmental administrations, 1994–2006.

The Year 1998–1999

Comments by the Chair:

Achievements In Research
• The most significant publication by members of the Department this past year was “Existence and Persistence of Invariant Manifolds for Semiflows in Banach Spaces,” by Peter Bates, Kening Lu, and Chongchun Zeng. Bates and Lu are members of the Department and Zeng was their 1997 PhD student, who since has held a postdoctoral position at Courant Institute of Mathematical Sciences, New York University. The 129-page paper appeared in September 1998 in the very prestigious series, Memoirs of the American Mathematical Society. The referee report on this paper calls it a “great piece of work,” mentions “powerful ideas,” and states that the authors have “settled a major problem.”
• Another significant paper is the one by Roger Baker on shifted primes that appeared in Acta Arithmetica. A reviewer of Baker’s most recently funded NSF proposal gives an indication of the quality of his work. The reviewer states that in terms of scientific
production, they (Baker and Harman) are in the top ten researchers in the world in analytic number theory.

- James Cannon and Eric Swenson published a 40-page paper in the prestigious *Transactions of the American Mathematical Society*.
- James Cannon and Greg Conner had two important and substantial papers accepted in *Topology and its Applications*.
- Wayne Barrett along with H. Tracy Hall (a BYU mathematics student) and Raphael Loewy (Technion) had a paper accepted in the prestigious *Proceedings of the London Mathematical Society*.
- Bates and Kening Lu have 7 and 4 accepted papers, respectively. Moreover, most of these are unusually long.
- Gerald Armstrong and Jack Lamoreaux co-authored a paper, their first publication in several years.
- Rod Forcade also published a paper for the first time in several years.
- Robert Speiser and Charles Walter were awarded a grant in April 1998 from the Exxon Education Foundation to support their research in children’s cognitive mathematical development. Speiser and Walter, who have worked in classrooms in elementary schools in Salt Lake City, received recognition last year by being appointed as Associate Editors of the *Journal of Mathematical Behavior*. Then Speiser became coeditor with Carolyn Maher (Rutgers) of the journal.
- Eric Swenson has received much recognition for his research in geometric group theory. A letter from Fredric Ancel of the University of Wisconsin-Milwaukee states that Swenson’s best research to date is his work with M. Dunwoody of the University of Southampton. Their “algebraic annulus theorem” is striking in its depth and generality, and promises to be a fundamental tool in geometric group theory. In June Eric was awarded a 3-year grant for $58,000 from the National Science Foundation to continue his work in geometric group theory.
- Tyler Jarvis was awarded a $31,000 grant for his research in algebraic geometry from the National Security Agency.
- The Department produced 3 PhD students in 1998. For two of their advisors, Steven Humphries and David Clark, it was their first doctoral student. This raises to 6 the total number of members of the Department who have had a doctoral student at BYU. Peter Bates had 4 PhD students and a M.S. student. One of these students, Junping Shi, completed his PhD in August 1998 and received an offer from Tulane University.
- Tiancheng Ouyang attended a conference in Italy in the fall and reported in his annual interview that 4 people there mentioned his work.

**Teaching:**

**New Positions and Calculus:** In November 1997 in response to a Program Improvement Request, the Administration gave the Mathematics Department four new positions beginning Fall 1998—two for Freshman Academy and two for expansion. The purpose of these positions was to enable us to break up large sections of Calculus into small ones. We are very pleased to be able to teach a much greater number of our calculus students in small sections and feel strongly that it provides a much better experience for them and faculty as well.
In January 1998, I was shocked to find that of 879 students enrolled in Math 119 for fall 1997, 419 of them were in two evening sections. To upgrade the experience of these students, I created one more large section of the course for fall 1998. Unfortunately, as seen from the chart above, enrollment in Math 119 increased so much that this action did not do much to alleviate the problem. So a lot more needs to be done here. Unfortunately, 4 new positions along with 4 retirements and 2 faculty leaving in 1998 created such a burden for hiring (see below) that it was untenable for us to make a request for further positions in 1998. Nevertheless, it is a long-term goal for us to eliminate all large section classes in the Department.

Several Department meetings and votes were held in winter 1998 to select a uniform text for all sections of Math 112 and 113. Although there are some disadvantages to uniformity, we have observed a number of desired benefits.

**Grade Distributions:** In January 1998, I read the first grade report for the Department since becoming chair and was dismayed by the unreasonable disparity in the GPA’s for different sections of multi-section courses. A particularly troubling example was Math 112, which had GPA’s ranging from 1.77 to 3.22. The distribution of grades for multi-section classes in winter 1998 was much better. For example, discounting one evening section in which one quarter of the students failed, the GPA’s in Math 112 ranged from 2.29 to 2.84. Two factors that likely contributed to the change were a Departmental final in Math 112 and Math 113, and my distribution to the faculty of a list of the GPA’s (without instructor names) given in all multi-section classes. In fall 1998 a comparison of GPA’s with averages on the departmental final for each calculus section, revealed larger disparities than would be expected. David Cardon of the Calculus Committee implemented a system in winter 1999 that did much to rectify this situation.

**Curriculum:** In fall 1998, I agreed to absorb CS 302 into our Department as Math 308 beginning fall 1999. The content of this course is teaching and technology. It has been restructured by Blake Peterson to better meet the needs of our secondary education majors. He taught it as CS 302 in fall 1998 and student comments on the instructor were very favorable. The Curriculum Committee, chaired by Stephen Humphries, worked out an extensive renumbering scheme for our courses in fall 1998 to bring them up to date with changes that had occurred in the Department and University.

**Department Goals:** My vision for the Mathematics Department is to create a center of excellence for teaching and research in accord with the aims of a BYU education. In a College council meeting in November 1997, my third month as chair, I enunciated three five-year goals:

- Quality hiring
- Strengthen Courses with special emphasis on Calculus
- Strengthen Links to Outside Professionals.

**Quality Hiring:** In September 1997 we knew of one or two positions that needed to be filled the following year. A Recruitment Committee was formed with Don Robinson as Chair, and Gerald Armstrong, Jasbir Chahal, and Bill Smith as members. Later that fall I wrote letters to around 15 LDS mathematicians encouraging them to apply for a position. The situation evolved into a massive hiring effort during the academic year. We were given four new
positions by the administration, four faculty retired, and two left. We were faced with replacing 20% of our faculty in one year, an incident that attracted enough attention that a Daily Universe article about hiring in the Mathematics Department appeared in spring 1998. I personally communicated with 20 applicants through e-mail and telephone. Here is a report on some of our notable hires.

1. Lawrence Gray, an eminent mathematician at the University of Minnesota, spent the first half of his sabbatical year at BYU in fall 1998. He is one of the three strongest LDS mathematicians not employed at BYU and we had maintained contact with him for several years in order to interest him in a visit.

2. David Cardon, a new tenure-track assistant professor who received his PhD from Stanford in 1996 followed by a two-year post-doctoral position at Queens University.

3. Eric Swenson, a new-tenure track assistant professor who received his PhD from BYU in 1993 under Jim Cannon. As noted above, Eric’s research accomplishments are already highly regarded.

4. Kenneth Kuttler, a Visiting Professor from Michigan Tech. The Department voted unanimously to extend an offer with CFS to Kuttler in winter 1998, but this was not approved by the administration. Fortunately, Kuttler was willing to come as a visitor and in 1999 we were able to hire him permanently.

5. Vladimir Miklyukov, a Visiting Professor from Volgograd State University. I learned about Vladimir from a former student who served a mission in Russia. Vladimir joined the LDS church in 1996 and we discovered from MathSciNet that he had a very long list of publications. No one on our faculty had ever met him, but we began a correspondence that eventually led to hiring him. For me personally, it was one of the rare very rewarding experiences that I have had as Chair. Three of the missionaries who taught Vladimir came to meet him and his wife when they arrived from Russia on July 16, 1998, two coming from Idaho and Colorado. Vladimir had very limited English skills when he came. He would not have been considered if he were not LDS. But he has made remarkable progress and is now an asset in more than just our research mission.

We also hired 8 others in temporary positions. They have almost uniformly been quality teachers. One, Bixiang Wang, was on a research post-doc associated with the Nonlinear Analysis Lab and had been an excellent collaborator with Peter Bates and Kening Lu.

On September 1, 1998 we knew there would be 12 open positions for fall 1999. Our Advisory Committee carefully considered who could assume this massive responsibility. James Cannon agreed to chair the Recruitment Committee and Kening Lu, Andrew Pollington, and Steve Williams agreed to serve as members of the committee. David Clark agreed to serve as secretary. We advertised nationally. I was involved extensively and I know the immense amount of work that members of the committee did. It has been the most massive hiring effort by any university department in my experience. As of today, July 31, 1999, we have hired 21 new faculty (not counting part-time teachers) and 1 new person in an administrative position.

**Strengthen Courses with special emphasis on Calculus:** Our Calculus Committee and I have worked to establish a core curriculum and common finals for our Math 112 and 113 classes. There have been a few problems. One professor through a misunderstanding omitted part of the core curriculum from 112 in fall 1998 and this necessitated an adjustment for his
sections on the common final. However, as we gain experience, we are improving. The biggest gains have been our assurance that students have learned the material in the syllabus for the calculus courses and that grades are more fairly distributed.

**Strengthen Links to Outside Professionals:** We have used existing resources in several ways. Roger Baker used his NSF funds and BYU funds to visit the University of Arizona in winter 1998. In the summer he visited Britain to give several talks and to work with colleagues there, especially his earlier doctoral student, Glyn Harman.

Because of his valuable contributions to an earlier research project, Wayne Barrett used his College Research Funds to take Tracy Hall, a Masters student, to Israel for two weeks in May to visit Raphael Loewy at the Technion, Israel Institute of Technology. He contributed brilliantly to the research project and in June Loewy, Hall, and Barrett were able to finish and submit another joint paper. Loewy gave an invited talk at an international linear algebra meeting in Madison, Wisconsin in June based on this collaboration.

Peter Bates used NSF, BYU and outside funds to speak in New York City, Mexico City, Hong Kong, Hangzhou, PRC, Taiwan, Caracas, Merida, Medellin, Sendai (8 hours), Hokkaido, Atlanta, and Cortona.

James Cannon gave talks in Paris-Sud, Nancy, Nashville, Knoxville, Park City, and South Hadley, Massachusetts. He spent the first four months of his leave working with collaborators in East Lansing, Blacksburg, VA, and Barcelona. Jim was able to fund all his travel with NSF funds and external sources.

College research funds made it possible for Tyler Jarvis, one of our junior faculty members, to attend the International Conference of Mathematicians (ICM) in Berlin in August of 1998. While there he presented some of his research results on the Picard group of the moduli of r-spin curves. One of the audience members afterwards came up and introduced himself—Takashi Kimura of Boston University. He was very interested in Tyler’s work and subsequently invited him to speak at Boston University in October. The talk at Boston University resulted not only in a collaboration with Kimura, but also in a collaboration with another faculty member at BU, Dan Abramovich, whom Tyler also met briefly in at a conference in Essen on his way to the ICM. Tyler’s collaboration with Kimura has already resulted in one paper where they (with Arkady Vaintrob) prove a conjecture of Edward Witten, one of the leading mathematicians in the world. At least one more paper is likely to result in the near future from this collaboration. Tyler says that the Dean’s research support for his trip to the ICM in Berlin will have resulted in at least three papers and at least two significant collaborations. He is very grateful to have had this support, since these collaborations would probably not have occurred without it.

On his leave in the first eight months of 1998, Kening Lu lectured extensively throughout the People’s Republic of China and in Singapore and Taiwan. He returned to Beijing in December 1998 to give a major address at the International Congress of Chinese mathematicians.

On his leave the first eight months of 1998, Andrew Pollington gave talks in Hong Kong, Rochester, NY, Toronto, Waterloo, Oberwohlhach, and Marseille, and collaborated with
Bill Moran in Adelaide, Australia. He used money from his NSF grant to bring Sanju Velani from Imperial College, London here for an extended visit in fall 1998 and they have commenced a very promising collaboration.

Robert Speiser spoke on his work in mathematics education in Singapore, Washington, D.C., and Raleigh. His new responsibility as co-editor of the *Journal of Mathematical Behavior* will bring him into contact with many others in the field.

Arkady Vaintrob was invited to visit the Department for a month last summer to work with our algebraic geometry group, in particular, Tyler Jarvis.

David Wright gave invited talks at special session of the American Mathematical Society in Gainesville, Florida and at an International Conference on Geometric Topology in Dubrovnik, Croatia.

Improvement in these three key goals is an ongoing process. We keep extensive records for hiring and have candidates in mind for Fall 2000, 2001, and 2002. In the past two years, it has required nearly a daily effort throughout the entire year to meet our needs and hire the highest quality faculty we can. Excellence in teaching is a very complex process and its assessment is likewise complicated. However, as my faculty have repeatedly heard me say, I believe there are two key elements to excellent teaching: high morale among the students and high standards. I constantly use these as guides in decision making. I have spent many hours reading student comments on teaching evaluations and discuss these with faculty during annual interviews and on other occasions. So much, however, depends on the teacher’s individual effort and desire to improve. I hope I have more influence here than is apparent. Likewise, there is not that much I can do to strengthen our links with outside professionals. I have distributed the departmental travel and College research funds as equitably and advantageously as possible subject to the limited knowledge I have. We stretch the supplies budget as much as we can to bring in visitors. More funding for visitors and travel would be a great help. Nevertheless, I am thankful that our Department is generously funded and supported in so many respects.

**RETIREMENTS:**

**Peter Crawley** left a tenured position at the prestigious California Institute of Technology to take a job at BYU, then a quiet backwater in mathematics. Through his vision and leadership as Chairman, and with the trust and support of the central administration, Peter built not only a respectable, but also a strong and highly regarded Department of Mathematics. It was Peter’s optimism, intelligent conversation, generous humor, and support for scholarly efforts that attracted new colleagues and inspired existing faculty in the department. While some individuals in positions of responsibility may focus on the hurdles, Crawley would always express optimism and support when a faculty member presented an idea for the enhancement of the department or program. Not only was the department improved through Crawley’s ability to attract good mathematicians, but he also presided over the establishment of a PhD program in Mathematics and he implemented a plan for regular external review with the goal to continually improve our programs. It is accurate to say that Crawley sacrificed his own, well-established research career to serve the faculty at BYU by enabling their best efforts. Even after his dozen years as Chairman, he has ever been one to whom we look for wisdom.
and direction. In addition to his great contribution to the Department of Mathematics, it should be recognized that Peter has given valuable assistance to the university library, upgrading the special collection of early Mormon writings whenever the opportunity presented itself to replace a volume with one of superior quality. With Peter Crawley’s retirement the University, and in particular the Department of Mathematics, loses a true friend and scholar. He will be sorely missed.

Douglas Garbe has served the department in a distinguished and honorable manner. Professors Gerald Armstrong and Jacqueline Taylor worked closely with Dr. Garbe and have given the following input: “Doug began his career in church education at the BYU Lab School where he worked in teacher training, and also formulated and taught student self-paced courses. When BYU High School was discontinued in 1968, he began to work concurrently for the BYU Mathematics and Indian Education departments, as a math teacher. He took a leave of absence and obtained his PhD in 1973. Doug’s creative work was concentrated on adult Indian education. He made weekly trips to Blanding, Utah for a couple of years to work with Navajo students, many of whom received degrees in education and other fields. He later traveled to Fort Duchesne to work with Ute Indians in the same way. These programs operated through off-campus courses in independent study. Since his work in the early 1970’s, he has seen many of the children of his former students come to BYU, and many have succeeded in various fields of study to become significant contributors to the workplace. Doug studied how math vocabulary influences how readily Indian students learn mathematical concepts. He also worked with problem solving skills of both Native Americans and local students. Lou Chatterley was Doug’s most frequent collaborator and long-time friend. Doug also contributed to the education of prospective teachers, teaching math for pre-service elementary teachers for over 30 years. He developed several courses for independent study, and taught in that program for over 30 years. Doug taught college algebra, Math 110, and calculus, Math 112 and 119, in large sections, on several occasions. He was part of the math education group in the department, and served in the usual areas there, including supervising student teachers. Doug’s most satisfying memories of BYU relate to 1) witnessing the development of persons with disadvantages, such as Native Americans, who needed positive experiences in math before they could succeed, 2) the development of math teachers, and 3) working with many fine colleagues in both math and Indian education.” Professor Garbe was fun to work with and was a friend to everyone. He served his family, the university and the church in a Christ-like manner. We will indeed miss him in the Department of Mathematics at Brigham Young University.

Ronald Jamison is very much in line with the mission of BYU. He begins each math class with a spiritual thought. His personal life is without guile and he remains committed to the aims of a BYU education as he teaches his courses. In the late 60’s and early 70’s, Ron developed a TV series for teaching college algebra and trigonometry that was beneficial to our department. He has published two textbooks dealing with college algebra and trigonometry. Professor Jamison advocates the use of technology in his classes and has kept abreast of new applications of mathematics pertaining to the real world. His lectures are very well prepared and his committee work has been excellent. Twice he has served as chairman of the organizing committee for the MAA Sectional Conference when BYU was the host, after which some MAA members of other intermountain schools have stated that BYU’s conferences have been unsurpassed. Ron has taught several large classes for the math department and has worked with many teaching assistants who have received professional
Donald Robinson: For the past 42 years, Don Robinson has been a major force in the BYU Mathematics Dept. Twice during that period he has served as department chair and has played a principal role in developing the department to its present professional level. Don has excelled in every aspect of academic life. Two comments from BYU faculty members of other departments who were once his students portray his effectiveness as a teacher. One says Don taught him the highly valued ability to see to the heart of a problem. Another says “My initial impression of Prof. Robinson was that he was a person devoted to the highest standards of intellectual integrity.” One of our former students, who is now completing an impressive doctoral thesis, wrote of Don: “The tests that he gave were difficult but fair, and he chose problems which made the tests learning experiences.” Don has written over 50 research papers, an outstanding accomplishment in mathematics. He has had collaborators in America, Belgium, China and India. From the beginning to the end of his career at BYU he has continuously discovered and published new mathematical results, even during the period he was Bishop of his ward. In 1997 Don received the Karl G. Maeser Research and Creative Arts Award. A colleague who has had the privilege of attending conferences in linear algebra with Don many times since coming to BYU knows from first-hand experience the respect Don has among this community of mathematicians. Don has also refereed a prodigious number of papers in linear algebra. Don has twice served as an officer in the Intermountain Section of the Mathematical Association of America. After his term as governor ended, a letter from the chairman of the section stated, “His experience and wisdom have been invaluable.” This has been our common conviction in the Mathematics Department. Don will be sorely missed, but our Department and BYU are much better and stronger because of his extraordinary example and service.

The Year 1999–2000

Dr. Gill: In this report, I did not find the comments from the chair, Wayne W. Barrett. I retired in August 1999 and I don’t remember much from this year. James Cannon took my place as Associate Chair in August 1999. From Lynn E. Garner’s Annual Report 2000, I share the following useful information:

Wayne Barrett and James Cannon spent an extraordinary amount of time in negotiating the terms of the Departmental Split and creating a new Department of Mathematics Education on July 6, 2000. Lynn E. Garner became the Chair of the Mathematics Department and Gerald Armstrong became the Chair of the Mathematics Education Department. This was a big step in resolving the major issues within the Mathematics Department. This was a time when the BYU Administration, College Deans, Department of Education, University Curriculum Committee, Mathematics Department, Mathematics Education Department, and faculty united in a Shared Vision of BYU and these departments on Teaching, Evaluation, Governance, Communication, Hiring, Advancement, Assessment, and expectations and shared responsibilities. The results are summarized by Lynn E. Garner in his annual reports for years 2000 and 2001. I compared the year 2000 with 2011 annual reports and came to the conclusion that this separation was good for both the Mathematics Department and the Mathematics Education Department. Both programs are much more focused, streamlined and growing in the best of traditions of their respective disciplines.
RETIREMENTS:

Gurcharan S. Gill, upon returning from his call to serve as the first mission president for the church in India, was a steady and calming influence in the Department. He was extremely unselfish, often taking tasks that needed to be carried out and that no one else wanted to do. Gill served as Associate Chair his last three years. A friend and mentor to younger faculty members, he was a bedrock of common sense, compassion, and good advice. One stated that “Gill’s work ethic and the respect with which he treated others both impressed and enlightened me.” Gill is a person of great integrity, courage, generosity and energy. He just does tasks for which many of us would take hours of deliberation and procrastination. In mathematics, Gill has produced algorithms and computations that point to the proper theoretical results while others stare into space and wonder what should be true. He has always put the needs of our students first and has expended a vast amount of time and energy producing web-based materials and upgrading independent study courses. His last major endeavor was to implement a computer based Math 110 course in the Department. One senior faculty member says, “Most of all, he is a fine gentleman and a genuine Christian,” while another writes, “For me personally, this kind of caring man has provided friendship and reassurance when challenges have arisen. He is several inches taller than I am, but that is only one reason why I will always look up to him.”

Jan E. Wynn has been an effective, influential, and devoted teacher. He taught nearly all the undergraduate offerings in the Mathematics Department, and a considerable number of graduate classes as well. A new member of the Department says that he was able to pass his PhD qualifying exam in complex analysis at the University of Texas because he took this course from Jan. One of our former chairs says that Jan was not just a good teacher, but a great teacher. Jan also made a great contribution to the service mission of the department by teaching Calculus 119 for many years. Jan may have taught more total students than anyone else in the department. Moreover, many students have remarked on his teaching ability and another faculty member says that no matter how many times he taught the same class, his attitude was fresh and enthusiastic. Jan is also known throughout the state as one who has worked cooperatively and in a friendly manner in training teachers for our schools. An example of Jan’s selflessness occurred a number of years ago when in a department meeting we were discussing establishing a PhD program. At one point Jan stood up and said with complete sincerity and some enthusiasm that he strongly supported the program and knew how he could contribute to it, namely by teaching more so that those doing research would be freer to work with students. Jan is a kind, helpful, gentle soul whose presence among us will be missed.

Lynn Garner was a student at BYU from January 1960, to May, 1962, having transferred from CalTech. He received his MA degree from the University of Utah in 1964; during 1963–1964, he taught ¾ time at BYU while finishing his degree at Utah. In 1966, he began PhD work at Cornell, transferring after one year to the University of Oregon, where he received his PhD in December 1968. His specialties were projective geometry, number theory, and calculus pedagogy.

The Year 2000–2001

Dr. Gill: The Full Report containing the split of the Department of Mathematics is available on the PDF Version of the Annual Report of the Year 2000-2001. This report is very comprehensive and it sets the expectations for each faculty and each department.

Comments by the Chair: The year 2000 has been a notable one for the BYU Department of Mathematics. The Department of Mathematics Education was split off on 6 July 2000, taking ultimately 14 positions and 35% of the teaching responsibility of the department. Lynn Garner was appointed chair of the Department of Mathematics on 1 August 2000, replacing Wayne Barrett, who had been chair of the department for the previous three years.

This report is primarily of the activities of the faculty now in the Department of Mathematics. Initial efforts for the chair included accomplishing the split, allocating resources, and carrying on the responsibilities of the department. We attempted to focus on the future and to do our jobs of teaching and research well. The chair interviewed almost all members of the department to gather input, from which a sense of the departmental strengths and struggles emerged. We were able to verbalize a shared vision for the department and a statement of expectations for faculty members.

The following eight individuals became permanent full-time faculty members in the Department of Mathematics Education beginning immediately:

<table>
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<tr>
<th>Blake Peterson</th>
<th>Jackie Taylor</th>
<th>Gerald Armstrong</th>
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<td>Dan Siebert</td>
<td>Chuck Walter</td>
<td>Gary Lawlor</td>
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</table>
| Bob Speiser   | Steve Williams

In addition to these permanent full-time faculty members, Bill Earl, Robert Pyne, Susan Barton, Larry Kimball, (and possibly David Tovey), who occupied a total of four FTEs as temporary faculty members and who performed important work in the mathematics education programs, were transferred to the new department, and there was an administrative
assistant/secretary position created. Two additional faculty FTEs were approved for Mathematics Education when new faculty could be recruited and hired in the new department. Gerald M Armstrong became the Chair of the Mathematics Education Department.

**Hiring 2000:** Hiring in the year 2000 was again a substantial endeavor. Three faculty members were hired into continuing status tracks. These were Michael Dorff, Scott Glasgow, and Darrin Doud. Michael was in the third year of a tenure-track position at the University of Missouri-Rolla when we hired him, Scott was completing three years as a visiting assistant professor at BYU, and Darrin (who is hired for Fall 2001) is completing the second year in a prestigious National Science Foundation post-doc at Harvard University.

Because the online Math 110 course has shown promise of being successful in the long term, we submitted a request to change one of our positions to a professional faculty position for three years to be the coordinator for this course. The position was advertised and we received six applicants. Laurel Howard, who had already taught for the Department for two years, was hired for this position.

Vianey Villamizar was hired for a one-year position to strengthen us in numerical analysis. The Department felt that the strongest candidate for this position was David Haroldsen and an offer was sent to him near the beginning of our hiring cycle. However, he eventually declined our offer, and we went ahead with Vianey. Three eminent senior visitors were hired as one semester visitors: Nick Alikakos of the University of Athens for Fall 2000, Ovide Arino of the University of Pau, France for Winter 2001, and Navin Singhi of the Tata Institute in Bombay for Winter 2001. Robert Pyne was hired as a one year visiting high school teacher. He subsequently became a member of the new Department of Mathematics Education. Larry Kimball was rehired into 2/3 of a position to supervise student teachers and also went to Math Ed.

Our Assistant (now Associate) Chair Chris Grant oversaw the search and advertisement for a Math Lab administrator to replace Beth Verbanatz, who decided not to return to the position after being away a year. Kristin Spencer, who had occupied the position while Beth was gone, was hired as the new Math Lab administrator. Chris also oversaw the search for a CSR to replace Jim Logan who was granted a 5-month leave. Shaun Sundquist was hired for this position.

Additional positions opened in the summer when Steve McKay decided to take a position at Utah Valley State College, Wayne Barrett was granted a one-semester leave, and Don Snow decided in July to retire effective Fall 2001. Kathy Andrist, an August 2000 graduate from our own department, and Lori Carmack, who had been a post-doc at Duke, were hired as one-year visitors into these positions. Kathy Andrist later decided to accept a more permanent position at Utah Valley State College beginning January 2001. With the loan of another half position from the College this left three half-year positions open for January 2001. Navin Singhi, mentioned above, was hired into one of these positions. We also interviewed Julianne Harris who was unable to accept the position. Eventually, Gro Hovhannisyan and Vahram Stepanyan, both of Armenia, were hired into these positions. After many years of service to the Department and University, Donald R. Snow retired and will be greatly missed.
RETIREMENTS:

**Donald R. Snow:** For many years Don Snow has taught a higher than average number of courses. He was always involved in teaching calculus and was influential in the directions that calculus has gone in this department. Don’s area of research was combinatorics via functional equations. He used every opportunity to acquaint students and faculty alike with the possibilities in his research area. He was a valuable member of this department for over 30 years. From December 1998 to December 1999 Don served in the New York New York mission, working primarily as the director of the Family History Center in New York City.

**Mathematics Majors**

**Undergraduate**
- Winter 2000: BA 215; BS 165
- Fall 2000: BA 147; BS 155

**Graduate**
- Winter 2000: MA: 13; MS:13; PhD:9
- Fall 2000: MA:10; MS:14; PhD:10

**Spring Research Conference:** The 14th Annual Spring Research Conference was held on 16 March 2000. This is sponsored by Brigham Young University College of Physical and Mathematical Sciences, and Central Utah Section of the American Chemical Society. We had 5 students participate; their topics are listed below. Eric Swenson was the organizer from our department.

- Brian Liechty, “Contingent Claim Valuation and Stochastic Analysis”
- Jeremy Magland, “Counting Subgroups of Baumslag-Solitary Groups”
- Jennifer Stanley, “Introduction to Variables: Student Responses after One Year of Pre-Algebra”
- Gina Thompson, “Generating Codes Using the Doubling Map”

We thank Eric Swenson for his tremendous amount of work. We are also very appreciative of his efforts as the session chair from Mathematics. Thanks also go to the faculty advisors of the students who participated.

**Putnam Team:** Vencil Skarda is the faculty advisor for our Putnam team, which competes annually, in December. The team has traditionally placed very well. The team members for 2000 were Don March, Ivan Murillo, and Johnny Vogler.

**Student Awards:** The Department held the 4th Annual Pi-Mile Fun Run in April, which was a big success. Many graduate students, mathematics majors, faculty and staff joined in a fun run/walk, barbecue and games. Awards were also presented for the spring research conference winners, and teaching performance. Graduate Student Teaching Awards were presented to:

- Overall: Emily Dixon
- PhD: Jian Long Han
- MS: Jonathan Bodrero
- MA: Vari Durrant

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Science Day: The annual Science Day was held on 14 October 2000. Several faculty presented talks.

Jasbir Chahal, “Math and Cryptography”
Lynn Garner, “A Budget of Paradoxes”
Lynn Garner, “The Story of Our Number System”

The Year 2001–2002

Comments by the Chair: This was the first full calendar year for the Mathematics Department since its separation from the Mathematics Education Department. In general, operations have proceeded smoothly as outlined in the documents that created the two departments. Cooperation has been full, with complete communications being a problem at times, such as at the institution of gateway exams in Calculus I.

We were able to hire the following five new faculty members into permanent track positions during 2001:

Darrin Doud, Harvard post-doctoral position
Denise Halverson, temporary BYU professor
Xian-Jin Li, temporary BYU professor
Steven McKay, UVSC professor (beginning in 2002)
Vianey Villamizar, temporary BYU professor

These vigorous young faculty members are making great contributions to the department, the university, and the profession.

Here is the statement of department shared vision that resulted from many conversations with faculty members of the department following the departmental split in July 2000.

Department Goals

The Department of Mathematics is actively pursuing its goals of effective teaching, significant research, and congenial citizenship. These goals are reflected in the department’s statements on Shared Vision and Faculty Expectations.

BYU Department of Mathematics Shared Vision

Brigham Young University is a major undergraduate university with strong graduate programs and research work, whose institutional objectives are to educate the minds and spirits of students within a learning environment that is spiritually strengthening, intellectually enlarging, and character building, and that leads to a life of learning and service, advance truth and knowledge to enhance the education of students, enrich the quality of life, and contribute to a resolution of world problems, extend the blessings of learning to members of the Church in all parts of the world, and develop friendships for the University and the Church.

The Department of Mathematics at Brigham Young University seeks to: Teach mathematics and mathematical thinking at the appropriate levels to enable students to employ critical analysis, thoughtful synthesis, logical deduction, and insightful problem-solving.
Extend the frontiers of knowledge in pure and applied mathematics in ways that involve student researchers, enrich instruction, support the undergraduate major and graduate programs of the department, and contribute to our understanding of the universe.

Build a unified and collegial atmosphere in which faculty and students support each other in teaching and learning, while focusing on student achievement and recognizing and rewarding excellence.

Expectations of Faculty

As guided by University policy and its own Shared Vision, the Department's expectations of faculty members include good teaching, productive research, and supportive citizenship.

Executive Summary: In reviewing the activities of the faculty of the Department of Mathematics for the year 2001, we made the following observations:

- All members of the faculty served on committees, with 21 of them filling major assignments or performing exceptional service.
- Fourteen performed service for the discipline by refereeing journal articles, and another 12 wrote reviews or evaluated research proposals for national and international organizations.
- Twelve faculty received instructor ratings of 6 or higher in at least one class.
- Seven faculty members are working on textbooks or special class notes.
- Fourteen are involved with class development.
- Twenty-nine faculty members submitted papers, had papers accepted, or had papers appear in refereed publications.
- Twenty-four collaborated with other researchers within the university or attended department seminars.

It thus appears that the departmental aims of teaching well, serving the needs of the department and university, and involvement in ongoing research of a significant nature are being met in major ways.

Major Accomplishments: Citizenship

Dr. Wayne Barrett served as Associate Editor for the journal, Linear Algebra and Its Applications.

Dr. Peter Bates was the Departmental representative for MSRI and for SIAM. He is also on the Editorial Boards of the following Journals: Transactions of AMS, Memoirs of AMS, Electronic J. Differential Equations, J. of Discrete and Continuous Dynamical Systems, International J. of Pure and Applied Mathematics, Electronic Journal of Mathematical and Physical Sciences. He was also a panel member for the Analysis Program of NSF.

Dr. James Cannon served as Governor of the Intermountain Section of the Mathematical Association of America (MAA) (Term ended 2001). He is also a member of the committee for choosing the Hedrick Lecturer, MAA. He participated as a guest lecturer for the BYU Mathematics Institute in June 2001.
**Dr. Michael Dorff** organized the Second Annual BYU Summer Mathematics Institute in June 2001. The Institute included 16 undergraduate students from 14 colleges and universities in 11 states as well as 5 undergraduates from BYU.

**Dr. Dorff** was a panel reviewer for the NSF “Course, Curriculum and Laboratory Improvement (CCLI) Program in the Division of Undergraduate Education. He was also a reviewer for Research Grant Proposals in geometric analysis for the Division of Mathematical Sciences of NSF. He delivered a set of four 2-hour presentations on topics in mathematics on using computers for 7th -12th grade mathematics teachers at the Summer Geometry School for Teachers at Timpview High School. He also delivered at 45-minute presentation title, “Games that Reinforce Math Concepts” for middle school teachers at the Utah Council of Teachers of Mathematics (UCTM) Annual Fall Conference at Brighton High School, Sandy, Utah, October 13, 2001.

**Dr. Denise Halverson**, as the Math 212 Coordinator, put together a syllabus for the instructors and helped organize a series of meetings with the College of Engineering in order to better understand the role that mathematics plays in engineering. She has also represented the Math Department in relations with the College of Engineering, working extensively with Jordan Cox, Associate Dean of the College of Engineering and Technology, to better understand the engineering/math issues and make improvements to the engineering/math sequence. This included outlining topics for the engineering math sequence, meeting with engineering department heads and other faculty, assisting in the writing of objectives for the Math 212 course, organizing meetings to better understand issues and promote interaction between the Math Department and the College of Engineering, organizing a collaboration team to work with Brent Nelson from the Electrical Engineering Department on a research problem and retrieving data on student test performance from the engineering math and calculus courses.

**Dr. Stephen Humphries** gave a one-week-long course (5 days 1 1/2 hours per day) as part of the Math Institute for graduate students during June 2001. The talks were on braid groups, knots and combinatorial group theory.

**Dr. William Smith** served on the College of Physical and Mathematical Sciences Committee on Faculty Rank and Status (Winter 2001).

**Dr. Vianey Villamizar** helped conduct the 3-day TA workshop in the fall in collaboration with Dr. Blake Peterson of Math Ed Department.

**Dr. David Wright** organized the Summer Geometry Institute for Teachers at Timpview High School, July 30–August 2, 2001.

The following faculty members served as **Senior Faculty Mentors**:

- Peter Bates mentored Scott Glasgow
- James Cannon mentored Michael Dorff
- Andrew Pollington mentored Xian-Jin Li
- William V. Smith mentored John Dallon
Scholarship

**Dr. John C. Dallon** developed complex equations and computer models that suggest to biologists how a particular protein causes skin scarring, giving them a jump-start on the effort to uncover a means of halting that process and avoiding blemishes.

**Dr. Andrew D. Pollington** was appointed as an Honorary Professor in the Department of Computer Science at Cardiff University for a period of five years beginning 1 March 2001. Here is an excerpt from the letter he received notifying him of this appointment:

“While your main activity will be to collaborate with Professor Fiddian and colleagues in the department, you should also be aware of the considerable importance which the University places on this arrangement…The decision to award you the appointment of Honorary Professor is only reached after the completion of rigorous processes which means that all concerned have confirmed the value of your input, and it is my pleasure to thank you for that.” Dr. Pollington also helped organize (and attend) a conference on the application of automorphic forms to number theory at IAS Princeton in April 2001.

**Advancement in Rank/Continuing Status:** Tyler Jarvis was promoted to Associate Professor.

**Student Awards**

Our department, along with the Department of Mathematics Education, held the 5th Annual Pi-Mile Fun Run on April 18th, which was a big success. Many undergraduate majors, graduate students, faculty and staff joined in a fun run/walk, followed by a barbecue and games. Awards were also presented for the spring research conference winners, graduate teaching performance, graduate service and outstanding major.

**Graduate Student Teaching Awards:** Andrea Perrine (MS) and Rachel Wood (MS)

**Graduate Service Awards:** Sarah Brown (PhD), Rachel Wood (MS) and Johnny Vogler (MS)

**Graduate Research Awards:** Paul Jenkins (MS) and Erin Summers (MS)

**Undergraduate** honorees included Melissa Clayton and Carrie Coleman as outstanding Junior majors, and Aaron Hill as outstanding Sophomore major.

**Orson Pratt Prize:**

The department opted to reinstate the presentation of the Orson Pratt Prize, which is given each April to the outstanding graduating senior. Lynn E. Garner and James W. Cannon, both members of the Pratt family, sponsored the award until 2006. In 2007, Dr. Garner was able to endow a fund for the Orson Pratt Prize and some scholarships. Awards eventually given were as follows:

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<tr>
<th>Year</th>
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<tbody>
<tr>
<td>2001</td>
<td>Pace Nielsen,</td>
<td>2002</td>
<td>Melissa Clayton</td>
<td>2003</td>
<td>Mark Meilstrup</td>
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<td></td>
<td>Johnny Vogler</td>
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<td>2004</td>
<td>Sharleen Roberts</td>
<td>2005</td>
<td>Jared P. Whitehead</td>
<td>2006</td>
<td>Meghan DeWitt</td>
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<td>2007</td>
<td>Casey Dougal</td>
<td>2008</td>
<td>Samuel Corson</td>
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<td>Sebastian Acosta,</td>
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<td>Ian Wright</td>
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<td>2010</td>
<td>Pedro Acosta</td>
<td>2011</td>
<td>Michael Griffin</td>
<td>2012</td>
<td>Rachel Suggs</td>
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The Year 2002–2003

Comments by the Chair: By far the most significant accomplishment this year has been the removal of the Math Lab from its remote location in KMB into our own building, TMCB. The idea was adopted last year when the former university computer center became available, but tight budgets required us to be creative. We were able to remodel the space in 149 TMCB for one of the computer labs and in 159 TMCB for the tutorial area without going over budget. The college provided a full population of computers for the two labs, and new furniture for the tutorial space and one of the labs, so that by the end of the year the Math Lab was up and running. It actually was down for only four hours during the physical move on October 25-26. Faculty are spending some of their office hours in the Math Lab. I believe this move will have more far-reaching effects on teaching than anything else we can do.

We also hired a permanent administrator for the Math Lab, Jackie Robertson. She had been an adjunct, teaching evening classes for us for several years, and was involved in running the math lab at UVSC. She had observed similar operations at several universities in the mountain west and brings mature experience and managerial skills to the job.

Other hiring this year involved just one position, and Lennard Bakker was hired as an assistant professor. He had taught at Franklin and Marshall for the previous year, after having taught at BYU as a visiting professor for two years.
The new Engineering Mathematics course, Math 302, debuted in fall semester. After careful planning for the previous year or longer, the course appears to have accomplished its purpose. Fine-tuning continues, of course, but members of the faculty, headed by Denise Halverson, are to be commended for their efforts in creating a sequence of courses that can stand the test of time. The College of Engineering also made many efforts and accommodations, mostly under the direction of Jordan Cox, in cooperating to establish these courses.

The teaching of calculus was a topic of discussion in several faculty meetings during fall semester. We have concluded that we need an on-line placement exam that students can take prior to registration to be advised on which course they are prepared to take. Steve McKay was assigned to prepare the placement exam. Students are now informed when they register for Math 112 that they must pass a pretest during the first two weeks of the course, and this procedure seems to be screening out the unprepared students quite well. Departmental exams continue in calculus, but several forms for the exams are used and the exams are given during the regularly scheduled time for each section.

Teaching evaluations seemed to be less of an issue this year. Indications are that departmental averages are at or above college averages. Faculty seem to be concentrating on teaching and research while doing their share to carry out the functions of the Math Department, leading to success at a higher rate than before.

Executive Summary: Major events of 2002 in the Department of Mathematics included:

- Relocation of the Math Lab in TMCB after 25 years in a remote location.
- Creation of a new Engineering Math sequence, Math 302 and 303, under dramatic cooperation between faculty of the Math Department, the Physics Department, and the College of Engineering.
- A successful Summer Mathematics Institute involving 16 undergraduate students and 11 Presenters.
- 24 Faculty in the Math Department: giving 57 scholarly presentations, 4 involving undergraduate researchers; publishing 31 peer-reviewed papers, 3 chapters in books, and one textbook; organizing 5 conferences or sessions of conferences; receiving 7 external grants; mentoring 18 undergraduates in research.
- 19 graduate and undergraduate students presenting in the Spring Research Conference
- A graduating senior receiving the Trjitzinsky scholarship from the AMS.
- A faculty member receiving a Karl G. Maeser Excellence in Teaching Award.

The Year 2003–2004

Comments by the Chair: This has been a good year for the Math Department in many ways. Scholarly activity is high—4 books, 5 textbooks, 132 scholarly articles (9 with student co-authors), 31 scholarly presentations, and 11 external grants. Teaching effort is strong—more peer reviews of teaching, a new course (Math 102: Quantitative Reasoning) planned by Rod Forcade with help from Darrin Doud and Brandon Baker, evolving of the engineering math sequence under the strong and insightful leadership of Denise Halverson, and more faculty spending office hours in the Math Lab.
The fourth annual Summer Mathematics Institute under the leadership of Michael Dorff was the largest yet, with enthusiastic participation of 18 students and 9 faculty. Student participation in the Putnam Exam under Darrin Doud’s tutelage was the highest in BYU history, with 23 students taking the exam. The team finished 51st out of 401 teams, the highest ranking in recent memory. Undergraduate research mentorship is high, with fellowships having been awarded involving 18 students and 12 faculty and two MEG’s having been funded involving another 8 students and 4 faculty. The Math Lab continues to be one of the most prized resources of the department, employing about 50 student tutors per semester and giving aid to about 80 students of mathematics per hour during its regular hours.

The Mathematics Department underwent its seven-year review during Fall Semester. Two external reviewers and four internal reviewers examined the department from many points of view. It was evident during the review that there are still bad feelings on the part of some of the faculty stemming from events that occurred as much as a decade ago. We eagerly await the report of the review, and hope that it will give us guidance on improving the department and its activities.

**Executive Summary:** A major activity for the leadership of the Department of Mathematics during 2003 was the self-study that preceded the departmental review. This summary is in the spirit of the departmental self-study.

The Department of Mathematics was created in 1954 [more accurately, given new life] at the creation of the College of Physical and Engineering Sciences; by 2000, the department had grown to 49 FTE’s. In July 2000, the Department of Mathematics Education was formed, reducing the size of the Math Department to 35 FTE’s. The slots are occupied by 34 permanent track faculty: 17 professors, 8 associate professors, one associate teaching professor, and 9 assistant professors. Four full-time staff members also serve the department: an administrative assistant, a department secretary, a CSR (shared with Math Ed), and the administrator of the Math Lab. Research-active faculty typically teach 4 or 5 courses per year, spending about 40% of their time in research. The remaining four or five faculty typically teach 8 courses per year.

The department has an average of 180 math majors on campus during any given semester. Graduates from our program have enjoyed admission to excellent graduate programs throughout the country. The department has about 17,000 registrations in service courses per year; these courses are steadily improving. The particular effort to create a better engineering math sequence has resulted in an excellent set of courses, produced by unprecedented cooperation between Mathematics, Engineering, and Physics. Internal efforts to coordinate the calculus courses have resulted in much more uniform sections and more consistent grading.

We have had a masters degree program for many years; the PhD program was instituted in 1987. The graduate program has about 20 students seeking the MS degree and about 8 seeking the PhD at any time. Most grad students have half-time teaching or research assistantships. Various efforts in recruiting have produced increasing numbers of applications from students of increasing ability. Our graduates with advanced degrees enjoy excellent placement. The graduate program serves to inspire the faculty to greater efforts, not only in their own research, but also in their teaching of undergraduate courses.
Several efforts recently instituted have increased the quality of our overall program. Superior undergraduate and graduate students are honored annually. Undergraduate research mentoring is increasing and provides an excitement not found earlier. The annual Summer Mathematics Institute provides a high-profile visibility for our graduate program. Challenges remain: unity of the faculty in the mission of the university has not yet materialized; faculty recognition at the department level can be improved.

**Faculty Deceased:** Richard Allen Hansen (1937-2003). Dr. Hansen has been a professor of mathematics at BYU since September 1967.

**Graduate Student Awards:** Our department, along with the Department of Mathematics Education, held the 7th Annual Pi-Mile Fun Run on 15 April 2003, which was a big success. Many undergraduate majors, graduate students, faculty and staff joined in a fun run/walk, followed by a barbecue and games. Awards were also presented to winners in the Spring Research Conference, graduate teaching performance, graduate service and outstanding majors.

  - **Student Teaching Awards:** Steven Butler, Celeste Elton.
  - **Service Awards:** Sarah Brown, Matthew Weber and Zhifu Xie
  - **Research Awards:** Benjamin Woodruff
  - **Undergraduate Student Awards:**
    - **Orson Pratt Prize:** This year the recipient was Mark Meilstrup.
    - **Undergraduate** honorees included Dustin Belt as outstanding Junior major and Nathan Manwaring as outstanding Sophomore major.

**Putnam Exam:** We had 23 students participate in the 2003 Putnam exam held on December 6, 2003, and seven students enrolled in Math 391R during Fall 2003 to prepare for the exam. There was also a weekly problem-solving contest during Fall 2003, which was related to the Putnam exam. John Blackhurst and David Ketcheson each won the weekly five-dollar prize five times. David Andrist won two times, Rachel Wagers, Ben Eckstrom and McKay Salisbury each won one time. Of the 23 participants, one ended up in the top 200 and two more ended up in the top 500. Our team ranked 51st out of 401 institutions and 3651 participants. This is a significant improvement over the previous year when we had only one student in the top 500, and ranked 91st out of 376 institutions. The average (median) score was 2 out of 120. 16 of our 23 students received a score equal to or above the average. The 2003 participants are as listed in the appendix. Below are the high scorers. These three were on the list of the top 500 participants, which was sent to all of the participating schools and is used for graduate recruiting at many schools.

  - Robert Bradshaw received a 32 out of 120, ranked 166th.
  - Wayne Rosengren received a 20 out of 120, ranked 403rd.
  - Aaron Hill received a score of 19 out of 120, ranked 466th.

**Mathematics Institute:** The Brigham Young University Summer Mathematics Institute offered a one-week intensive program in Minimal Surface Theory for college juniors and seniors from BYU and other universities. **Participants:** Robert Berry, Utah State U.; Elizabeth Ehret, Denison U. (Ohio); Jason Gerber, Illinois College; Amy Grainger, U. of New Hampshire; Kyle Herrity, U. of Michigan; Jamie Jorgensen, Utah State U.; Catherine Law, Furman U. (South Carolina); Marsha Lubitz, North Dakota State U.; Melissa Maisch,
Boston College; Gita Maisuria, U. of Houston-Downtown; Amy Marolt, Mississippi State U.; Ellen Miles, U. of Evansville (Indiana); Ty Molchan, Muhlenberg College (Pennsylvania); Laura Roede, Grand Valley State U. (Michigan); Alison Ruff, College of Mt. St. Joseph (Ohio); Courtney Thompson, Edinboro U. of Pennsylvania; Mu Wang, BYU Hawaii; Nick Werner, College of New Jersey; and Erin Wisor, Juniata College. **Speakers:** Lennard Bakker; Wayne Barrett; James Cannon; John Dallon; Michael Dorff; Lynn Garner; Denise Halverson; Stephen Humphries; David Wright.

**The Year 2004–2005**

**Comments by the Chair:** We were all saddened when Professor Jack Lamoreaux, a member of the department faculty for 36 years, passed away unexpectedly on 13 April 2004. Lawrence Fearnley, a long-term collaborator in general topology, referred to Jack’s “generosity of spirit” contributing to the friendship and collaboration. Rod Forcade, a close friend and collaborator, said that Jack “was one of the few people with whom I could be completely open and direct at all times—because he never judged. Even when we disagreed, we respected each other’s thought processes. I think that’s what made Jack such a good teacher—that he was more interested in provoking his students to think than in judging their intelligence or abilities.” We will miss Jack’s low-key but steady, rock-solid influence in the department and in our classrooms.

2004 marked the beginning of new levels of departmental activity, especially in carrying out the functions of the department. In January, a Planning Committee, partly elected and partly appointed, was put in place to respond to the recommendations of the two review teams who visited the department in Fall 2003. Not only did the Planning Committee make their own responses to the recommendations, but condensed them into working documents for the administration. The Planning Committee also helped hammer out a departmental hiring strategy; made recommendations for a renewed department committee structure, members of the Planning Committee volunteering to take major responsibilities; and revised the Departmental Shared Vision and Mission statement, including an internal working document outlining ways in which we plan to accomplish the goals of the department.

With the new committee structure in place for Fall Semester, the department has seemed to be able to accomplish more. We are paying more attention to teaching, to students, to visiting scholars, and to hiring. More nominations are being written to honor faculty for various awards. Departmental grant proposals are being constructed, an NSF grant for $158,000 over three years for an REU being the first prize for its proposers, with Michael Dorff as PI.

We were able to successfully recruit Jeffrey Humpherys to join our department in January 2005. We had been tracking Jeff’s progress through a post-doc and were able to match his transition time with our need to fill the vacancy left by Jack Lamoreaux.

We began again to have undergraduate majors activities when Denise Halverson reactivated the Math Club and the Pi Mu Epsilon chapter at BYU.

All in all, the department is making progress. With three faculty passing third-year reviews and four passing sixth-year reviews and receiving continuing faculty status, we are becoming
quite a bit more stable than in some previous years. While there are still some unresolved issues with some faculty, there seems to be a mechanism in place to seek resolution. Many good things are happening.

Executive Summary: The number of majors in Undergraduate research mentoring is holding steady in the department at about ten students per semester. We hope to increase the level of participation. Participation in the Putnam exam increased dramatically this year. Our graduate class entering Fall 2004 was the largest yet. We are placing more emphasis on peer review of teaching and other measures of teaching effectiveness.

Research: Several faculty have ongoing excellent and productive research programs. We are not seeing as many research proposals as we should. Our fifth annual Summer Mathematics Institute was very successful. It will be replaced for the next three years by an NSF REU.

Major Accomplishments

Citizenship: The major development of this past year affecting citizenship in our department was the formation of a Planning Committee. Faculty elected four participants, Jim Cannon, David Wright, Wayne Barrett, and Michael Dorff. Also serving on the committee are the undergraduate coordinator, Rod Forcade; the graduate coordinator, Tyler Jarvis; the associate chair, Chris Grant; and the chair, Lynn Garner. The initial charge given to the planning committee was to analyze the reports of the external and internal review committees of Fall 2003, which report was received in early 2004. The Planning Committee not only completed the analysis, but made specific recommendations. When the request was made that the recommendations be condensed into a one-page report, focusing on what the department intended to do in the near future, the Planning Committee undertook the revision of the departmental shared vision and mission statement.

The Planning Committee also recommended a revised committee structure for the department, with most members of the committee taking major responsibilities. The committees were in place for Fall 2004 and much has been accomplished by them already. The other major accomplishment of the Planning Committee was the adoption of a departmental hiring strategy, designed to affect the future of the department as positively as possible, given the hiring pool. Efforts have been increased to recognize and commend service to the department.

Scholarship: The faculty continued active in scholarly pursuits, though at a slightly lower level of activity than in 2003. Fifteen of the 33 faculty produced 36 scholarly works, and 18 gave a total of 48 scholarly presentations, many of them invited.

Rank & Status Advancements: David Cardon, Sum Chow, Michael Dorff, and Eric Swenson passed their sixth-year reviews and were granted continuing faculty status and the rank of Associate Professor. Darrin Doud, Denise Halverson, and Vianey Villamizar passed their third-year reviews and were granted candidacy for continuing faculty status.

Teaching: Teaching efforts seem to by paying off in better results all the time. Student evaluations seem to be rising slightly. With all the reviewing of teaching, more effective emphasis is being placed on peer reviews. A teaching committee has been active in publicizing grades this year. Grades (not identified with students) must be in the public
domain in order for effective control of grade inflation and uniformity in multi-section courses.

The Year 2005–2006

Comments by the Chair: As my term as chair completes its last calendar year, I wish to remark on the experience that I’ve had managing the Department of Mathematics at Brigham Young University. First, I wish to thank those who have been so supportive of the department leadership: Dean Earl M. Woolley and his associate deans, particularly Dana Griffen, in the College of Physical and Mathematical Sciences and AAVP Richard Williams, AVP John Tanner, and the two presidents of Brigham Young University, Elder Merrill J. Bateman and Elder Cecil O. Samuelson, under whom I have served as chair. The clarity with which the administration has taught policy has increased dramatically over the past six years. I appreciate their candor. Their support in locating the Math Lab near the Math Department office and in creating the MURM Lab are among the best developments in my tenure.

I want to thank the support staff and administrators in the Mathematics Department, Leri Dawn Smith, Executive Assistant, Lonette Stoddard, Department Secretary, James Logan, CSR, and Jackie Robertson, Math Lab Administrator. As BYU organizational and business practices have changed, these people have rolled with the punches, absorbing dramatic changes with courage and steadfastness.

I thank the faculty of the Math Department who have paid attention to their performance in teaching, in research, and in service to the department, forsaking the tendency to involve themselves in politics. I thank those who have become less worried about things political, focusing more on the activities for which they were hired. I have felt increased support from the faculty as the years have gone by.

I have also felt that there are major directions for the department to take that I have not had the energy or imagination to instigate. I commend my successors in department leadership, encouraging them to look in new directions where appropriate, not forgetting the basic mission of the department and the university. After all the effort we exert to make changes, they are only for the better if things are better for the students and the mission of the university than they used to be.

Being a faculty member at BYU has been a marvelous life. The students keep us young, the learning goes on, and we have wonderful people with whom to associate. It has been a great 42 years for me.

Executive Summary: Rather than extract statistics from the annual report, let me give qualitative impressions of the faculty, staff, and students in the Department of Mathematics. The students who come to us are great people, in that, on average, they have inculcated the gospel into their lives and are therefore wise beyond their years in terms of the important human interactions they experience. While they are still growing and learning and have not been reared in a society that particularly cares about thinking, learning, or mathematics, they come with good talent, are adaptable, and discover that they love to learn. Many of them will become great in academic endeavors; all of them will make a difference to the society in which they spend their lives.
Our administrative and staff people love working at BYU, with BYU students, and are
tireless in the fulfillment of their duties. They have had to be quite adaptable, but without fail
they have kept the best interests of the department and university uppermost in their attitudes
and actions. Their dedicated service has given a foundation to the performance of the
department as a whole that is essential to our mission.

Our faculty members are for the most part dedicated to the mission of BYU. Where there are
discrepancies, there is also room for and the promise to grow. Our faculty include researchers
with world-wide reputations, teachers of great skill and sensitivity, and servants willing to go
the extra miles. Their abilities have made the Math Department great in many ways and
promise to make exceptional contributions in the future. Their love for mathematics and their
caring for the students and for each other will continue to enhance the performance of BYU
in its mission.

Major Accomplishments: During 2005, the Department of Mathematics maintained its
mission of teaching, research, and university service. In addition to furthering individual
research programs, meeting the demand for classes, and moving the work of the department
forward, we achieved some outstanding accomplishments, both as a department and
individually.

MURM Lab: The major facility addition during 2005 was the Mathematics Undergraduate
Research Mentoring (MURM) Lab. This was conceived by Dr. Jeff Humphreys who
proposed a facility that could assist undergraduate researchers, especially in computationally-
related projects, in doing research in closer physical proximity to their faculty advisors. He,
with the help of our CSR, James Logan, suggested space used for a student lounge on the
mezzanine of the Talmage Building, proposing that a wall be erected separating the space
from the hallway. The College of Physical and Mathematical Sciences endorsed the proposal,
the University administration concurred, and during Fall Semester the MURM Lab was
constructed. The Lab now serves undergraduate researchers all hours of the day and night
with some sophisticated computers and some group study space where seminars and work
sessions can take place. The construction was able to retain the outstanding view of Mount
Timponogos from the second floor of the TMCB.

Dr. Jeffrey Humphreys cuts the Möbius Strip ribbon, opening the MURM Lab, as Associate Dean
Dana Griffen watches. Two students are holding the ribbon across the doorway.

Dean Earl M. Woolley makes the second cut of the ribbon as Dr. Humphreys watches.
Promotions: Three of our faculty were promoted to the rank of Associate Professor: Dr. John Dallon, Dr. Scott Glasgow, and Dr. Xian-Jin Li. Three of our faculty achieved Continuing Faculty Status: Dr. John Dallon, Dr. Xian-Jin Li, and Dr. Steve McKay.

Graduate Student Awards: Our department, along with the Department of Mathematics Education, held the 8th Annual Pi-Mile Fun Run on 14 April 2005. The event was attended by undergraduate majors, graduate students, faculty and staff, and was followed by a barbecue and games. Awards were presented to winners of the Spring Research Conference, graduate teaching performance, graduate service and outstanding majors.

Outstanding Teaching Award: Jason Grout and Ivan Andrus
Service Awards: Ivan Andrus, Amanda Ellis, Lauritz Petersen, Gretchen Rimmasch
Outstanding Research Award: Christopher Cornwell, Zhifu Xie
Undergraduate Student Awards:
   Orson Pratt Prize: This year the recipient was Jared P. Whitehead.
   Undergraduate honorees included Casey Dougal as outstanding Junior major and Natalie Wilde as outstanding Sophomore major.

Putnam Exam: Dr. Darrin Doud coached the Putnam team this year. The Putnam Exam was held on December 4, 2004, and 24 BYU students participated. We received the results in April 2005. BYU’s team consisted of Aaron Hill, Brian Boring, and Pedro Acosta. BYU placed 110th in the nation, out of 411 colleges and universities that had teams. Our top scorer was Samuel Chiu, a senior, who graduated and is now in the military, scheduled to go to Iraq soon. Our second highest scorer was Yu Yang Edison, a freshman from China, who will be returning next year to take the exam again. We had a tie for third place, with Aaron Hill, a senior, and Ilya Raykhel getting identical scores. The number of women taking the exam went up dramatically, from 0 in 2002 to 1 in 2003 to 4 in 2004.

Spring Research Conference: The 19th Annual Spring Research Conference, sponsored by Brigham Young University’s College of Physical and Mathematical Sciences, was held on 19 March 2005. We had 24 students participate. Lawrence Fearnley was the organizer from our department.

MAA Intermountain Section Meeting: This year the Mathematical Association of America held its annual Intermountain Section meeting on 5 March 2005 in Pocatello, Idaho. BYU sent several students and faculty members to participate.

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<thead>
<tr>
<th>Speaker</th>
<th>Class</th>
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<tr>
<td>Thomas Bell</td>
<td>Senior</td>
<td>A New Proof of the Isoperimetric Inequality of the Circle</td>
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<tr>
<td>Brian Boring</td>
<td>Senior</td>
<td>A New Approach to Solving Isoperimetric Problems</td>
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<tr>
<td>Jason Grout</td>
<td>PhD</td>
<td>Understanding a Matrix Completion Problem Using the Lovasz Theta Parameter</td>
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<td>Brian Hansen</td>
<td>M.S.</td>
<td>A Conjecture of Ash, Doud, and Pollack</td>
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<td>Don March</td>
<td>Senior</td>
<td>Expanding Melzat’s Algorithm to Find SteinerMinimal Trees</td>
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<td>Gregory Miller</td>
<td>Senior</td>
<td>The Four-Point Problem in Hyperbolic Space</td>
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<td>Gretchen Rimmasch</td>
<td>PhD</td>
<td>Invariants of Rational Elliptic Curves</td>
</tr>
<tr>
<td>Glen Simpson</td>
<td>PhD</td>
<td>Finding Number Fields Satisfying Certain Conditions</td>
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Doing what he loves most has earned one BYU math professor the “Distinguished Teaching Award” in the Department of Mathematics. Stephen Humphries, who currently teaches Math 300, History of Math, was honored Thursday in the HBLL Auditorium for excellence in teaching. “Steve cares more about teaching the student than looking smart, and in the end, he does both,” said Carolyn Savage Wright, who presented the award. “He not only has the ability to solve math problems, which is quite the trick in itself, but he can also solve people’s problems with mathematics.” Established as a gift from Wright through the Savage Foundation, the award is a stipend of $1,000 given every year to one deserving math teacher.

20-year Service Award: presented to Lonette Stoddard in January 2005.

Tyler J. Jarvis, Chair (2006–2012)

Tyler Jarvis received his BS degree in 1989 and his MS degree in 1990, both from BYU. He received the Orson Pratt Prize at BYU in 1989. He received his MA degree from Princeton in 1992 and his PhD from Princeton in 1994. He joined the BYU faculty in 1996. His specialty is algebraic geometry, focusing on moduli of spin curves.

The Year 2006–2007

Executive Summary

Goals: We set several new goals for the department. Two of the most important are

• To substantially improve the quality of our lower-division service courses.
• To make our undergraduate program one of the very best in the nation.

Highlights: Some of the highlights in our progress toward those goals are the following:

• CURM: The NSF has given us a 1.3 million dollar grant to create the Center for Undergraduate Mentoring in Mathematics, the national center for undergraduate math mentoring.
• IDeA labs: The Mathematics Department, along with Statistics and Computer Science, was given a $700,000 grant by the NSF to support labs to involve students in research.
• REU: Our NSF funded Research Experience for Undergraduates, a summer program to help undergraduates do research in mathematics, has developed a national reputation.
• The number of students involved in undergraduate research has increased by 41% since 2005.
• The number of students presenting at the Spring Research Conferences has increased from 24 in 2004 to 38 in 2007. In addition, at the Mathematical Association of America regional conference (involving 70 departments), 13 of the 28 student presentations were by BYU Mathematics students.
• We are ranked 14 of 841 US institutions for the total number of undergraduates who continue on to finish a doctoral degree in mathematics or statistics.
• Putnam Exam: A department-level contest and coaching by faculty has increased involvement at the national level from 5 students per year to over 20. This year our Putnam team ranked #18 in the nation (out of 402 teams).
• Undergraduate Colloquium: Each semester, three noted mathematicians and skilled speakers explain their work and get students excited about mathematical research.
• Advising Majors: We have begun a formal system of tracking and meeting with our majors yearly, and have met with 140 of the 201 so far.
• Major enrollments have increased from 155 in 2000 to 203 in 2006.

**Faculty Scholarship**

• Faculty scholarly productivity has almost doubled since 2003, and scholarly activity has increased steadily from .59 to .70.
• 16% of our faculty has external funding in addition to the mentoring grants mentioned above. This is far above the national average in Mathematics of roughly 1% per year.

**Challenges:** Our main ongoing challenges are:

• Increasing demands on faculty time and resources caused by the Quantitative Reasoning Course, Engineering Math courses, and other factors.
• Space needs: Our expanding mentoring groups need lab space, and our small department office cannot house the 12 full- and part-time people who work there. We hope that when the Mathematics Education Department moves in summer 2007 we will be able to have some of their space to help solve these problems.
• Difficulties arising from having a many of our courses taught by the Mathematics Education department.

**Putnam Exam:** The Putnam exam is a national contest each December for undergraduate students in mathematics. The problems on the exam are notoriously difficult, and the median score on the exam nationally is 0 out of 100. In 2006, a total of 3640 students took the exam nationally. We recently placed new emphasis on involving students in this contest, and the number of BYU participants rose dramatically, from roughly 5 per year to over 20. In March 2006, we started a department level contest similar to the Putnam in order to encourage students to participate in the Putnam exam and in order to select our best students for our national Putnam team. Darrin Doud has also spent many hours working with students, teaching, coaching, and encouraging them. The new department-level contest, combined with
special coaching for students from Darrin Doud, resulted in our being ranked #18 in the nation (out of 402 teams) in 2006.

The Year 2007–2008

The slime mold Dictyostelium discoideum has served as the testing ground for mathematical modeling techniques in biology. The images on the cover are simulations of patterns formed when Dictyostelium cells, in the face of starvation, abandon their existence as free-living amoebas and aggregate. The model that produces the image captures the combined effect of subcellular processes and self-organizing behavior. Red represents the highest cell density blue the lowest.

This was the cover on the March-April 2007 issue of the American Scientist magazine. (Image used courtesy of John Dallon.)

Executive Summary

**Goals:** We continue to work towards achieving the goals we set in 2006.

**Highlights:** Some highlights in our progress toward those goals are the following:

- **CURM:** Our NSF-sponsored BYU Center for Undergraduate Research in Mathematics began its first year as the national center for undergraduate math mentoring. CURM is gathering significant attention from major organizations like the Mathematical Association of America.
- **IDeA labs:** We have continued to work with Statistics and Computer Science to mentor students in our NSF-funded IDeA labs.
- **REU:** Our NSF-funded Research Experience for Undergraduates, a summer program for undergraduates to do research in mathematics, has developed a national reputation for excellence and produced several published papers. The number of students involved in undergraduate research increased by 50% since last year.
- **Putnam Exam:** Our efforts to coach and recruit students to participate in this international competition paid off in 2007. Our team was ranked 33rd out of 413 teams.
- **Advising Majors:** We have implemented a formal system of tracking and meeting with our majors yearly.
- **Scholarships:** Thanks to a generous donor and some royalty moneys, we were able to endow two new scholarships for math majors.

**Scholarship**

- The number of peer-reviewed pages published per faculty member has steadily increased for several years and was more than two-and-a-half times as much in 2007 as it was in 2003.
• 20% of our faculty have external research funding, in addition to the teaching and mentoring grants mentioned above. This is far above the national average in mathematics.

• Fulbright: For the third year in a row, a faculty member from our Department received a Fulbright Award. Greg Conner was one of only 4 awardees in mathematics in the nation in 2007.

• Karl Maeser Distinguished Faculty Lecturer: Kening Lu, who is both an excellent teacher and a world leader in the field of infinite-dimensional dynamical systems, was recognized with the University’s highest faculty honor.

Challenges: Some of our ongoing challenges are
• Increasing demands on faculty time and resources caused by the Quantitative Reasoning course, the Engineering Math courses, undergraduate research mentoring, and other factors.
• Difficulties arising from having many of our courses taught by the Mathematics Education department.

The Year 2008–2009

Executive Summary

Goals: We continue to work towards achieving the goals we set in 2006.

Highlights: Some highlights in our progress toward those goals are the following:
• We appear to have the largest undergraduate mathematical mentoring program in the country, and the number of students involved in undergraduate research in the Math Department has increased by 36% since 2007.
• Our recruiting and retention efforts have resulted in an increase of 10% in the number of majors and an increase of 47% in the number of minors.
• Putnam Exam: Thanks, in part, to our coaching and recruiting efforts, our team placed 23rd out of 404 teams in this international undergraduate mathematics competition.
• CURM: Our NSF-sponsored BYU Center for Undergraduate Research in Mathematics continued its success as the national center for undergraduate math mentoring. CURM has continued to gather significant attention from major organizations like the Mathematical Association of America.
• IMPACT Program: We had positive feedback from external reviewers and substantial results from this NSF-funded interdisciplinary student research program.
• REU: Our NSF-funded Research Experience for Undergraduates, a summer program to help undergraduates do research in mathematics, was renewed for another four years of funding.
• Advising Majors: We have added two new seminars to help advise and support majors. We have also expanded and improved our formal system of tracking and advising all our majors each semester.

Scholarship
• More faculty were engaged in research this year than ever before. The activity index rose to 79% from 70% in 2007—this is a large increase from 2003 when it was 59%.
• The number of peer-reviewed pages published per faculty member has also generally increased over the past several years and is now double what it was in 2003.
• The number of proposals submitted for external funding increased by 17% from 2007 and by 500% compared to 2006.

Challenges: Some of our ongoing challenges are:
• We have an extraordinarily small number of faculty, and we have increasing demands on faculty time and resources caused by the Quantitative Reasoning Course, the Engineering Math courses, undergraduate research mentoring, and other factors.
• We face serious difficulties arising from having many of our courses taught by faculty in another department.

The Year 2009–2010

Executive Summary

Goals: We continue to work towards achieving the goals we set in 2006.

Highlights: Some highlights in our progress toward those goals are the following:
• We have the largest undergraduate mathematical mentoring program in the country, and the number of students involved in undergraduate research in the Math Department has further increased by 44% this year.
• Many of our faculty are excellent teachers and researchers, but two received national recognition this year: Michael Dorff was awarded the most prestigious teaching award in the profession— the Franklin and Deborah Tepper Haimo Award, and Jeffrey Humpherys was awarded the very prestigious NSF CAREER award.
• Our recruiting and retention efforts have resulted in an increase of 15% in the number of majors since 2008 and 43% since 2007.
• As part of our outreach efforts, we launched our new website, When Will I Use Math.com targeted towards informing high school and college students about careers that use math and why they need more mathematics.
• CURM: Our NSF-sponsored BYU Center for Undergraduate Research in Mathematics continued to receive significant attention from major organizations like the Mathematical Association of America for its success at helping faculty at other universities learn to mentor as successfully as we do at BYU.
• REU: Our NSF-funded Research Experience for Undergraduates, a summer program to help undergraduates do research in mathematics, has developed a national reputation for excellence and produced several published papers.
• Putnam Exam: Our continued efforts in recruiting and coaching resulted in our team’s being ranked 24th out of 546 institutions in the US and Canada.
• Math 119 revision: We have initiated a dialogue with the Business School and the College of Life Sciences about how to improve Math 119, which is currently a mixture of business calculus and math for biologists. We have made good progress on some major changes to the course that we believe will greatly improve student learning and better serve these students.
Faculty Scholarship

- Faculty productivity was the highest it has been in many years. The productivity index rose to 1.6 from 1.1 in 2008—this is a double what it was in 2003.
- The number of peer-reviewed pages published per faculty member has also increased over the past several years and is now triple what it was in 2003.

Challenges: Some of our ongoing challenges are:

- We have an extraordinarily small number of faculty, and we have increasing demands on faculty time and resources caused by undergraduate research mentoring, increasing numbers of majors, and other factors.
- We face serious ongoing challenges arising from having many of our courses taught by faculty in another department.

The Year 2010–2011

The group PSL(2,\mathbb{Z}) acts on a 2-sphere with four branching points. This is the image of a certain simple closed curve under an element of PSL(2,\mathbb{Z}), when projected stereo-graphically onto the plane. Courtesy of Dr. Stephen Humphries.

Executive Summary

Goals: We continue to work towards achieving the goals we set in 2006.

Highlights: Some highlights in our progress toward those goals are the following:

- We already have the largest undergraduate mathematical mentoring program in the country, and the number of students and faculty involved in undergraduate research in the Math Department has continued to grow (from 7,377 hours in 2009 to 8,304 hours in 2010).
- Undergraduate students are publishing in excellent, peer-reviewed research journals, and one student, Sebastian Acosta, published six peer-reviewed research publications as an undergraduate.
• BYU Math majors continue to be in high demand at top graduate programs: for example, Patrick Turley, who graduated from our program in April 2010, received offers from Harvard, Stanford, Princeton, MIT, Chicago, and Cal-Berkeley.

• Course Improvements: After consulting with the Business School and the College of Life Sciences, we developed two new courses (Math 116 and 118) to replace Math 119. These changes should improve student learning and better meet the students’ needs.

• Our recruiting and retention efforts have resulted in an increase of 59% in the number of primary majors since 2004.

• CURM: Our NSF-sponsored BYU Center for Undergraduate Research in Mathematics continued to receive significant attention from major organizations like the Mathematical Assoc. of America for its success at helping faculty at other universities learn to mentor as successfully as we do at BYU.

• REU: Our NSF-funded Research Experience for Undergraduates, a summer program to help undergraduates do research in mathematics, has developed a national reputation for excellence and produced several published papers.

• Putnam Exam: Our continued efforts in recruiting and coaching resulted in our team’s being ranked 16th out of about 550 institutions in the US and Canada.

• New responsibilities and resources were transferred to the department at the end of the year. We are responsible for teaching 25 additional sections of mathematics each year, and three FTEs were transferred to the department to help us fulfill that new teaching responsibility.

Scholarship
• The number of published pages per faculty member continued to rise this year to 32. This is almost twice what it was in 2008 (18) and more than three and a half times what it was in 2003 (9).

• The faculty productivity index was 1.5, which is close to what it was in 2009 (1.6). The department’s publication venue score (V in the Sederberg equation) is 62, which is the highest it has ever been.

Challenges: Some of our ongoing challenges are:
• We have an extraordinarily small number of permanent staff, considering the number of students and faculty in the department. According to the external reviewers, our staff members are “stretched to the elastic limit.”

• Preparing students for careers in industry. Students clearly need more offerings from us in applied and computational mathematics. This is the future of mathematics in industry, and the job market is already asking that students have background in these subjects. We are working to address this need with a new program, but do not currently have the resources to do this properly.

• Recruiting good graduate students from outside of BYU.
The Year 2011–2012

Dr. Gill: This last annual report details the success of the mathematics programs and their development since the separation of the Mathematics Department from the Mathematics Education Department in the year 2000. Also, in a similar fashion, the Mathematics Department was separated administratively from the Physics Department in 1954, the year I came to the United States of America to study. Both Professors Lynn E. Garner and Tyler Jarvis presided over this recent development. The strength of the faculty and their enthusiasm, productivity and dedication to the Shared Vision of the Department of Mathematics and Brigham Young University are evident when we compare the year August 2000-August 2001 with the year August 2011-August 2012. The BYU Mathematics Department is now very mature, strong, and ready to compete with the best mathematics departments in the nation. I came to BYU as a student in 1956, graduated in 1958 and returned as a faculty member in 1960. I have personally known all of the Department Chairs from Milton Marshall to Robin Roundy. It has been a distinct privilege for me to be associated in a small way with the BYU Mathematics Department over the last 56 years.

Math department’s Mathletes, Sam Dittmer (10), Hyrum Golze (25) and Robert Yang (24) as they appear in a BYU produced video: “What if we treated star students like star athletes?” Sam, Hyrum and Robert represented BYU in the Putnam Mathematical Competition in December 2011 and placed 24th out of 572 colleges and universities from the USA and Canada.

Executive Summary

Goals: We continue to work towards achieving the goals we set in 2006.

Highlights: Some highlights in our progress toward those goals are the following:
- New ACM Emphasis: In order to better prepare students for non-academic careers in mathematics, we developed and gained administrative approval and support for a new emphasis in Applied and Computational Mathematics.
- Mentoring: We already had the largest undergraduate mathematical mentoring program in the country, and the number of students and faculty involved in undergraduate research in the Math Department continues to grow.
• Growth in Majors: The total number of math majors was 308 in Fall 2011, which is the highest it has been since math education became a separate department in 2000, and is up 88% from 2004. In 2011, 66 students graduated in mathematics—the most in recent history, and up 50% from 2004.
• Scholarly Publications: The number of published pages per faculty member continued to rise this year to 44—the highest ever recorded.
• External Funding: Faculty submitted 36 grant proposals, almost twice as many as submitted any other year in recent history.
• Sloan Fellow: Jessica Purcell received the prestigious Sloan Fellowship—only the second person ever to receive this award at BYU.
• INFORMS Fellow: Robin Roundy was inducted a fellow of the professional society Institute for Operations Research and the Management Sciences (INFORMS) for his innovative research in supply chain optimization and for his teaching and contributions to the field of operations research.
• CURM: Our NSF-sponsored Center for Undergraduate Research in Mathematics continued to receive significant attention from major professional organizations. The National Science Foundation has announced that they will provide $1.28M to fund CURM for another five years.
• REU: Our NSF-funded Research Experience for Undergraduates, a summer program to help undergraduates do research in mathematics, has developed a national reputation for excellence and produced several published papers.
• Putnam Exam: Our continued efforts in recruiting and coaching resulted in our team’s being ranked 24th out of about 570 institutions in the US and Canada.

Challenges: Some of our ongoing challenges are
• We have an extraordinarily small number of permanent staff compared to the number of students and faculty in the department. As explained by the external reviewers last year, our staff members work very hard and do an excellent job, but they are “stretched to the elastic limit.”
• Hiring good faculty. We have several open positions, but the pool of excellent potential faculty has been disappointingly small this year. Some promising candidates are in the pipeline—finishing degrees or starting post-docs—but most are a few years from being ready to come to BYU.
• Recruiting good graduate students from outside of BYU has been a challenge for many years and continues to be a concern.

Overview: In 2010, we continued our ongoing effort to improve the quality of our undergraduate major programs and our undergraduate service courses. These programs and courses were already very good compared to other mathematics departments nationally, but as a department we are committed to making them still better. We have continued working toward the long-term goal of making our undergraduate major programs and service courses the best in the nation. Our main developments and achievements this year have been in the areas of Curriculum, Mentoring, Other Support for Students, Faculty Scholarship, and Outreach. We also discuss in this report some of the many signs that our program is succeeding at helping our students.

Curriculum: In order to best serve our students, we made some significant changes to our curriculum this year. Most important was the development and approval of the new emphasis in Applied and Computational Mathematics. We also implemented changes to our service
offerings, including discontinuing Math 119 (business calculus) and replacing it with a new business-oriented course, Math 118.

**Applied and Computational Mathematics Emphasis:** One of the most exciting new developments in the Math Department in 2011 was the creation and approval of the Applied and Computational Mathematics Emphasis. We based the curriculum for this emphasis on input from both industry and academia. This emphasis will help our mathematics students better connect with business, medicine, engineering, and a myriad of other disciplines and will help them become leaders in innovation. A recent study examined the roadblocks to innovation in the coming generation by interviewing several leading industrialists. The following general themes emerged as being of prime importance for future and sustainable growth in their respective industries:

1. A need for better modeling and simulation methods and technologies.
2. A workforce more capable of interdisciplinary design.
3. Better tools and understanding for analyzing uncertainty and risk.
4. Greater capabilities for dealing with large data sets.
5. New methods for coping with complex systems.
6. Improved capabilities for predicting and understanding market behavior.

The common thread to each of these themes is the intimate role that mathematics is expected to play in innovation. It is also clear that mathematicians will have to work in teams rather than in isolation. The new emphasis in Applied and Computational Mathematics is designed to prepare students who can address these challenges and meet these needs.

Beginning in the Fall of 2013, juniors who have taken the prerequisite courses will join together in a cohort of up to 40 other students and enter into the world of interdisciplinary mathematics. The new emphasis adds eight new courses (with labs) to our curriculum. Students in the emphasis will first need to complete the requirements for a math minor as well as Math 341 in their freshman and sophomore years. They will then take these eight courses together with a cohort of 40 students over the following two years. Students will also choose an interdisciplinary concentration in an area such as biology, chemistry, civil engineering, computer science, economics, electrical engineering, or any of a number of other disciplines.

We are now beginning to build the program infrastructure, helping faculty become fully conversant with the program and helping advisors become intimately knowledgeable. A fully functioning internship program needs to be up and running, which we are working on. The college has promised us a new Category 1 employee to help with internships and the Academic Vice President has promised us a new faculty FTE to help teach the courses. We need both of these people to help direct this buildup so that by Fall 2013 the program launches smoothly.
Changes to Service Courses: In 2011, we implemented the previously approved discontinuation of Math 119 (it still continues through Independent Study, but is not taught on campus) and the introduction of a new course, Finite Mathematics, Math 118. The primary audience for this course is pre-business students. We developed this course in conjunction with the Marriott School and we feel it will meet students’ needs much better than the old Math 119 did.

Math 118 was first taught in Fall 2011. By using everyday business problems as the basis for the math problems, business students have begun to see the benefits of using math in making business decisions. On the final day of class in one of the (200-student) sections of Math 118 taught in Fall 2011, the students gave the instructor a standing ovation, which we see as evidence that the new Math 118 course is achieving this goal of helping students appreciate the value of mathematics.

Mentoring: One of the main ways we serve our students is through mentored research. We have many programs to do that, as well as to teach others how to do that more effectively.

Mentored Mathematics Research: According to the former president of the Mathematical Association of America, Joe Gallian, the BYU mathematics department has more undergraduate students involved in mentored research than any other mathematics department in the country.

During 2011, twenty-one professors mentored 86 undergraduates doing research. The research they undertook was meaningful, in many cases resulted in a Student Research Conference presentations, and, in several instances, culminated in presentations at off-campus venues such as the AMS Joint Meeting, or at MathFest in Lexington, KY, or at Ohio State, or at the MAA sectional meeting at Cedar City.

Additionally, visiting faculty member Emily Evans has initiated a semi-monthly Undergraduate Presentation Seminar. At each of these one-hour events, one or two students have the opportunity of presenting to their peers. These confidence-building forums afford our students the chance to hone their skills and better prepare them for the world they will soon enter.

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<th>BYU Mathematics Undergraduate Research</th>
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<td><strong>Year</strong></td>
<td><strong>Undergraduates in Research</strong></td>
<td><strong>Presentation at Spring Research Conference</strong></td>
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Of the 86 undergraduate students doing research in 2011, nine published their work, six more submitted their work for publication, six gave poster presentations, and 52 presented (several did multiple presentations).
CURM: The national Center for Undergraduate Research in Mathematics (CURM) finished its fourth full year of operation in 2011 with Michael Dorff as director. CURM was established by a $1.26 million grant from the National Science Foundation (NSF). We have recently been informed that a renewal grant has been funded for $1.28 million, which will keep the center operational for 5 more years. The awarding of this grant validates the success that both BYU and the Department of Mathematics have had in mentoring undergraduates in research. The objectives of CURM are to promote undergraduate research in mathematics throughout the United States by

1. Training professors as mentors for undergraduate research projects.
2. Providing funds to professors to establish undergraduate student research groups at their own institutions during the academic year.
3. Advising professors on how to organize and continue to operate undergraduate research groups at their own institutions.
4. Preparing undergraduate students to succeed in graduate studies in mathematics.

More information is available at the CURM website: curm.byu.edu.

CURM helps undergraduate students at universities and colleges throughout the U.S. begin and succeed at doing undergraduate research. It also focuses on underrepresented groups in mathematics. Over the past four years, CURM has accomplished the following:

1. Awarded mini-grants to 64 professors (41% female, 19% minority) from 54 different institutions.
2. These 64 professors worked with 195 undergraduate students (54% female, 29% minority)

During the first three years of CURM (2007-2010), the period for which we have complete data:

1. 147 undergraduate students wrote 60 joint research papers, 15 of which were published in research journals.
2. CURM students have given 123 single or joint conference presentations, 35 poster presentations, and have received 29 awards for their presentations or research.

Finally, the data we have indicates that at institutions participating in the CURM program, about 18% of the math majors go on to graduate school, while 63% of the CURM students at these schools go on to graduate school

REU: Also related to our efforts in mentoring is our NSF sponsored Research Experience for Undergraduates (REU) in Mathematics funded by a $336,000 grant from the National Science Foundation (NSF) and directed by Michael Dorff. The program’s goals are to (a) involve undergraduate students in mathematical research; (b) encourage undergraduate students, especially women and students from Principally Undergraduate Institutions (PUIs), to attend graduate school in mathematics; and (c) prepare participants to be successful in graduate school. Typically, the BYU REU involves 12 undergraduate students, 60% female and 75% from PUIs. All undergraduate participants write a research paper and present their results at a national meeting. More information is available at the REU website math.byu.edu/reu/.
For the 2011 REU program, there were about 200 applications by undergraduates from about 150 different universities and colleges throughout the U.S. The sixteen 2011 REU participants produced

1. five student-authored research papers
2. seven student presentations at national conferences with four of the presentations winning awards for top presentations out of the over 125 presenters
3. four poster presentations at national conferences with two winning an award for one of the top poster presentations out of the 275

The BYU mathematics REU has a national reputation as a challenging and successful program. It was not uncommon for non-LDS participants in our REU to be accepted to several other REUs but to have chosen our REU instead of the others. The REU has also provided a powerful influence in motivating students to make the transition to graduate studies in mathematics. Of the undergraduate students in the BYU REU, most stated that before the REU they were unsure about attending graduate school in mathematics, but after completing the BYU REU, over 85% have actually gone on to graduate school in mathematics.

**IMPACT Program and CSUMS Grant:** In 2011, BYU’s NSF-funded Interdisciplinary Mentoring Program in Analysis, Computation, and Theory (IMPACT) commenced its fifth year. This program centers on interdisciplinary research in mathematics, statistics, and numerical computation. Although the NSF CSUMS grant that initially funded the program ended in 2011, on March 20, 2011, the program received generous funding from an anonymous donor to continue for two more years (until the summer of 2013).

**Other Support for Students:** In addition to mentored research and our regular teaching, we do many things to provide other support to our students.

**Advising Majors and Minors:** In an effort to help students navigate the major, to offer them a larger window into the world of mathematics, and to better prepare them for careers or school after graduation, we offer personal advisement to both math majors and minors. Out of our total 308 undergraduates, almost half availed themselves of this service. We believe that formal advising has a significant positive effect on student success and on our ability to retain students in the major. For this reason, we hope to substantially increase the percentage of students who see an advisor each year.

<table>
<thead>
<tr>
<th>Advised per total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seniors</td>
<td>76/135</td>
</tr>
<tr>
<td>Juniors</td>
<td>27/68</td>
</tr>
<tr>
<td>Sophomores</td>
<td>22/62</td>
</tr>
<tr>
<td>Freshman</td>
<td>8/43</td>
</tr>
<tr>
<td>Total Undergrads</td>
<td>133/308</td>
</tr>
</tbody>
</table>

**Internships:** As reported in 2010, we have made strides in offering internships to our students. Previously we had applied for and received a $9,100 grant in support of our program. We were able to hire a student employee for 10 hours per week and bring the program up to a preliminary level. As of the end of 2010, we had placed three students and
had a list of 80 potential internship possibilities. By the end of 2011, we had increased that to 110 internship possibilities and have placed another seven students.

We have set a goal of expanding our offering of internships to 150 and placing 15 interns in 2012. The ultimate goal is to institutionalize our program and to set as a requirement of graduation, either 200 hours of undergraduate research or serving an internship.

Evidence of Success With Students

Major Field Test: As part of our learning outcomes assessment, all of our graduating senior students are required to take a standardized national exam—either the Major Field Test (MFT) or the GRE Subject Test in Mathematics. The students who plan to go to graduate school take the GRE and the rest take the MFT. The MFT is a comprehensive nationwide exam covering most of the standard undergraduate level mathematical curriculum. In 2011, a total of 320 other institutions participated in the exam. Of the 200 possible points, the mean and median were 154. BYU’s scores (average of 181 and median 184) were approximately three standard deviations above those of other participating schools, placing most of our students in the upper one percentile of all those who took the math MFT in 2011.

Students who take the GRE Math Subject Test instead of the MFT are generally much better prepared than those who take the MFT, so the very positive MFT results provide significant evidence that our students are mastering a core of nationally accepted learning objectives.


Intermountain Mathematics Competition: On Saturday, October 15th, 69 students from five universities in the Intermountain area participated in the contest. Out of a possible 70 points the top 10 scores were as follows: 57 BYU (Golze); 55 BYU (Dittmer); 47 BYU (Yang); 39 BYU; 36 BSU; 35 UNR; 34 BYU; 29 BYU; 28 BYU; 27 Utah.

VTRMC Sponsored by Virginia Tech: BYU’s team participated in the Virginia Tech math competition on October 29th and finished third among some great schools. Taking the top three students in each school, the results were as follows:

U of Michigan 160; Carnegie Mellon 154; **Brigham Young 150**; Worcester College 133; Duke 121; Harvey Mudd College 120; Yale 109; U of Maryland 71; NC School of Sci. & Math 53; UNC at Chapel Hill 50; Vanderbilt 50; U of Rochester 41; UVA 31.

The spreads on these results place BYU solidly among some of the top schools in the country. We are separated from the two schools above us by 10 points or less and stand well above those below us.

Putnam: The Putnam Math Competition began in 1938 and is a national math competition for US and Canadian undergraduate students. It is the premier math event. BYU students have participated in this competition for more than 45 years with very impressive achievements. [See tabulated results and participants in the appendix.]
In 2010 the BYU team ranked number 16 in the Putnam Math Competition nationally. Forty-three participated in the exam, and of these, 19 received positive scores (the median of the test is zero). Five of the students placed in the top 500, while one student received an Honorable Mention (top 85).

On December 4, 2011, 40 BYU students participated in The Putnam. On the 20th of March we received word that BYU placed 24th out of 572 schools in the US and Canada, where 4,440 contestants from these schools participated.

In 2012, the BYU team should be much stronger than the last two years. BYU team members include Hiram Golze (rank 63, 2010), Sam Dittmer (rank 54, 2008), and Peter Baratta (rank 134, 2009). They are the best BYU undergraduates in the last 10 years.

In order to improve the training program for the math competition and encourage more BYU students to participate in the Putnam Math Competition in 2012, we have created the Putnam Seminar Class (Math 391R). These Putnam Seminars run throughout the year and are even offered to talented high school students interested in the program.

Historically, the department has invited professors with expertise on the IMO (International Mathematical Olympiad) or Putnam competitions to visit BYU and train our students. The duties of these visiting experts include helping train BYU students for the Putnam and other math competitions; making and selecting problems for BYU team tryouts: giving lectures and colloquia on the skills of problem solving; and offering special individual training for selected BYU team members. This year we invited two coaches from China who spent a total of five weeks working with our students. They did an excellent job and helped produce outstanding results in the Putnam.

**Number of Math Majors**

**Growth:** The number of math majors continues to increase at a relatively steady rate, from 164 in 2004 to 308 in 2011. The number of students graduating in mathematics each year has also grown from 30 in 2005 to 66 in 2011. We believe that this growth is primarily due to two things: first, our efforts to improve our major, and second our efforts to help students learn about career opportunities in math. We expect these numbers to continue to increase as students further recognize the many benefits that a math degree offers and as our program continues to improve, including the addition of our Applied and Computational Mathematics emphasis.

**Recruiting and Retention:** We do well at attracting new majors from the undeclared pool but only break even relative to those who change majors. The most recent statistics from the CPMS advisement center show the following outflows and inflows to the Math Department:

<table>
<thead>
<tr>
<th></th>
<th>Winter 2011</th>
<th>Fall 2011</th>
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</thead>
<tbody>
<tr>
<td>Outflows from math to other departments</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Inflows from other departments to math</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>Inflows from new admissions (undeclared)</td>
<td>28</td>
<td>70</td>
</tr>
<tr>
<td>Net to math</td>
<td>+7</td>
<td>+70</td>
</tr>
</tbody>
</table>
Faculty Scholarship

Faculty Awards: We have outstanding faculty in our department and this year two received prestigious research awards. These are Jessica Purcell, who received a Sloan Fellowship, which is awarded to early career scientists with the potential to make substantial contributions in their field, and Robin Roundy, who was elected a fellow of the Institute for Operations Research and the Management Sciences (INFORMS).

Other than Dr. Purcell, BYU has only had one other faculty member receive a Sloan Fellowship (Tracy Hall). To the best of our knowledge, the only other current faculty member to have received a Sloan Fellowship is Jim Cannon, who received a Sloan fellowship while a faculty member at the University of Wisconsin, before he came to BYU.

In November 2011, BYU mathematics professor Robin Roundy was inducted as a fellow in the Institute for Operations Research and the Management Sciences (INFORMS). The institute inducted Roundy for his research accomplishments in operations research and management sciences. INFORMS is a distinguished operations research society devoted to applying scientific methods to advance operations and management functions. This area of study focuses on applying advanced analytical methods and mathematics to help organizations make beneficial decisions. Roundy was specifically recognized for his innovative research in supply chain optimization and for his teaching and contributions to the field of operations research.

Several other math faculty have received awards which are still active from the department, the college, the university or from professional associations, including Jeff Humpherys’ NSF CAREER award and Darrin Doud’s Alcuin fellowship. Including all these awards, our 34 full time faculty have at least 16 previous external awards for scholarship. Among the faculty awards we have

- Two NSF CAREER awards (the most prestigious award given by the NSF to young Scholars.
- Two Karl G Maeser Distinguished Faculty Lecturers.
- Two Sloan Fellows.

Additionally, the faculty have received at least 21 external awards for teaching, among them:

- One Haimo award winner (the most prestigious award in the US for college mathematics Teaching.
- Four MAA awards for distinguished College or University Teaching of Mathematics.
- Three Karl G. Maeser Excellence in Teaching Awards.

While the Department’s scholarly productivity index was down somewhat in 2011, the faculty activity index grew slightly, and total number of pages published was much larger than it has ever been.

Pages Published and Scholarly Activity and Productivity: Although the number of papers published per faculty member was down slightly in 2012, the number of pages published (a better measure of productivity in mathematics) was up. We had 35 fulltime, permanent-track
faculty and we had 35 papers published. And 25 of those faculty published at least one paper in 2011, for an activity index of 74%, which is up from 68% last year.

We note that these indicators do not track the number of papers submitted or accepted, but only published. The variability we see year-to-year in these indicators is probably not due to a corresponding variability in the actual productivity nor activity of the faculty, but rather is due to the fact that in mathematics there is a large lag time (often years) between submission and acceptance, and again between acceptance and publication. In addition to the 35 papers that actually appeared in 2011, at least 30 more papers have been accepted and are awaiting publication. Moreover, many other papers have been submitted and are awaiting acceptance. Based on these numbers we expect that the total number of publications, and hence the productivity index, will be much higher in 2012, but, of course, most of the work that will appear in 2012 was already completed several years earlier.

There is also great variability in the length of papers in mathematics, often one longer, more significant paper is a much greater contribution to the discipline, and is usually more work, than several shorter pieces. Therefore, if we are tracking total productivity, the number of pages published is a better measure of the work that faculty members did than the number of publications.

The total number of pages published continued to grow: it was 1489 in 2011, up from 1101 in 2010. This means that we averaged 44 pages per faculty member—the most we have ever recorded.

**External Funding:** Our grant proposal submissions tripled from 2010 to 2011, from 11 submitted in 2010 to 36 in 2011. These 36 proposals represent $12M in funding requests. In 2011 we had two grants funded, totaling $85,000, but we also recently received notification that the NSF will again fund CURM with a $1.28M grant, so our return on the 36 grants submitted in 2011 currently stands at $1.37M. Many of those proposals are still pending.

**Outreach:** A nationally recognized trend in education is the lack of interest in math and the sciences. For whatever the reasons, other nations produce a higher percentage (and in many cases, higher numbers) of scientists and mathematicians than we do. Further, we have noticed that large numbers of students who do well at math in high school do not take additional mathematics courses at the university. This prevents them from majoring in any of the disciplines in our college.

Our outreach efforts are primarily directed at addressing this serious problem. We have been involved in significant outreach efforts for several years, both for public schools and for university-level students.

For the public schools and for pre-college students we continued several outreach efforts begun earlier, including

- Arranging public recognition for Junior High and High School students who do well on the AMC exams and offering AMC exams on campus for students whose schools do not offer them.
• Developing print, online, and other media resources for school math teachers to answer the question, “When will I use this?” Most prominent of these is the website WeUseMath.org.

• Importance of mathematics and the many rewarding career opportunities available to students who study mathematics.

• Expanding our highly successful Weekend Math Circle program for students in grades 5–12 to include a math circle for children in grades 2–4.

• Explicitly contacting and encouraging students who do well on AP and AMC exams to consider majoring in STEM fields, to remember the importance of mathematics in those fields, and to consider the benefits of studying at BYU.

As a result of our 2011 effort, we have attracted several of Utah’s top high school math students to BYU and to major in math.

The department is also engaged in outreach initiatives at the college level and in the general public, both locally and nationally. Our CURM program has championed undergraduate mentored research among many universities nationally, and locally, and we put a lot of effort into reducing the level of fear engendered in non-mathematicians as they come face to face with an equation. An example of this is the eight-page article in the Marriott Alumni Magazine, Winter 2012 pages 20–27, that encourages business majors to face their fear of mathematics, written with close collaboration between the Marriott School and Dr. Jeff Humpherys. Our development of Math 116 and 118 are also intended to help with this.

Goals: In addition to the goals of improving lower division service courses and becoming a superior undergraduate program, three sub-goals we have are to seamlessly implement our new Applied and Computational Math Emphasis (ACM); to maintain our progress in quality teaching, curriculum, and mentoring; and to compete well in local and national mathematics competitions.

Improve Lower Division Service Courses: Essentially all mathematics courses are service courses, since large numbers of non-majors enroll in our courses at every level, including advanced graduate courses. In fact, roughly one-third of the total enrollments in our graduate courses are from outside our department, including computer science, engineering, statistics, and physical sciences.

Our approach in accomplishing this goal is as follows:

1. Reviewing and revising the course syllabi, desired learning outcomes, texts, and other material.
2. Assigning faculty who are widely recognized as excellent teachers to teach the lower division service courses.
3. Carefully supervising inexperienced, adjunct, part-time, and student instructors and TAs.
4. Paying careful attention to teaching assignments in order to capitalize on faculty teaching strengths.
5. Being in regular contact with our main client departments to make sure that the content of these courses is in line with their current needs.

For item 1, in 2011, we continued to review and improve course learning outcomes for many of our courses. Items 2 and 4 have been working effectively since we began that process in
Fall 2007. Under item 3, we have been running a year long TA training seminar for graduate TA’s, holding a weekly teaching seminar for all faculty, TA’s and instructors in the department, and asking experienced faculty to visit the classes of less-experienced instructors. Item 5 is an ongoing process: the most important development in this process is the recent development of two new courses, Math 116 and Math 118, to replace the former Business Calculus course, Math 119. This was the result of an extended effort working with the business school and the College of Life Sciences to try to help ensure our courses were appropriate for their students’ needs. We continue to meet with various client departments in an ongoing effort to improve our service to students and departments across campus. Currently, we are consulting with departments across campus about how to further improve our linear algebra curriculum (Math 313).

Some of the metrics we use to measure progress toward the goal of excellent service courses are

1. Major and minor enrollments. As quality in service courses improves, we expect to see more students electing to become math majors and minors and better retention of existing majors. We have seen the number of primary majors grow from 164 in 2004 to 308 in 2011. The number of minors has also grown from 308 in 2004 to 373 in 2011.
2. Student ratings. We expect student ratings of instructors to continue to improve and student comments to be increasingly positive. The latter is somewhat difficult to quantify, but seems to be generally true. Also, the department average for student ratings of instructors has been improving.

**Become the Top Undergraduate Program in the US:** We have made substantial progress toward this goal, as indicated in the main body of the report above. Two sub-goals we have are to seamlessly implement our new Applied and Computational Math emphasis (ACM), and to continue to recruit and retain good students.

**Implementation of the Applied and Computational Math Emphasis:** The new ACM emphasis will provide great benefit to our students, but will also require significant coordination and planning to implement well. The Applied and Computational Mathematics (ACM) emphasis requires the following changes:

1. Hire a CAT-I support employee to run the internship program.
2. Hire faculty with applied and computational background to help teach the program.
3. Advise our current crop of freshmen and sophomores about prerequisites so that 40 juniors will be ready to enter the program in Fall of 2013.
4. Coordinate with other colleges and departments the interdisciplinary concentrations, i.e., which non-math courses to blend with the math.
5. Coordinate class schedules so that each cohort can attend their core classes together.
6. The total number of math and ACM majors to an aggregate 358, with 40 in the ACM emphasis and the number of non-ACM majors remaining constant or also increasing.

**Compete well in national math competitions:** To promote the BYU Math brand, some form of national recognition has to be attained. We already have an excellent reputation in the following areas:
• Undergraduate research, both as to quality and quantity
• The quality of our graduates, both as to skills and values
• The quality of our interns
• The BYU environment, i.e., we can attract great students

But we need something more to truly stand out. Doing well in national math competitions should help boost our visibility and establish our reputation as an undergraduate mathematics powerhouse. The most recognized of these competitions is the Putnam Exam. Last year we ranked 16th, this year we ranked 24th. Our goal is to break into the top ten by

1. Recruiting excellent students and
2. Training our students well, and
3. Encouraging new students to participate in competitions and problem solving activities.

We seem to be well positioned for 2012 and expect to score very well on the Putnam in December.

**Math Lab History, 2002-Present**

Jackie Robertson began supervising the Math Lab in July of 2002. Her remarks on the operations of the Math Lab since then are given here.

My mission was to create an environment for students to learn and enjoy mathematics. I also wanted to improve the use of technology by students for math, improve the administrative system, and improve the training of tutors.

Dr. Garner, who was the department chair at the time, was very supportive. He would always ask, “What would you like to do?” He also was helpful in getting anything we needed for the math lab. The college in the past would cover the cost of running the math lab but Dr. Garner helped the math lab get its own budget to run on its own.

When the Math Lab moved to TMCB, Dr. Garner requested that professors spend one office hour per week for each of the classes serviced. This was very beneficial in getting students to know about the math lab and for the student employees because it gave them the opportunities to observe how professors teach one on one. (Some of the professors participated and some did not.) As knowledge of the math lab increased, the number of students that came in increased. The “Fish Bowl” [a glassed-in study room in one corner of the Math Lab] is a place for groups to study and faculty to work with these small groups. Here the faculty can have small study groups with students in their classes where they can teach and observe students work.

At first, undergraduate research took many of our strong tutors. We then looked into how to keep good employees and draw people from other majors. We did marketing through pencils, bookmarks, flyers, etc., to make more people aware of what the Math Lab has to offer. This allowed students who didn’t frequent the Math Lab because they understood the material to know that they were able to apply for a tutor position. We also started getting more employees from different majors. We have had employees in math, math ed, engineering, psychology, biology, music, etc.

Over the past ten years we have implemented other new ideas. We created the student administrative positions. The Assistant Administrator position was created to help in the responsibilities of scheduling when tutors would work, helping keep track of the budget, helping to project the future budgets, track employee records, and be a part of the hiring process. The Upper
and Lower Division Head Tutor positions were created to help train tutors in their respective divisions on concepts and problems that would be coming up in the week. They are also in charge of keeping track of the classes covered by their division and scheduling reviews and providing assistance in any way the Math Lab can for those classes. They also are part of the hiring process.

For a period of time before 2002, there was no tutor training going on. We re-instated tutor training with a weekly meeting where concepts from that week’s material would be covered. The tutors were separated into their divisions and taught the material according to what classes they help with. Data is used to pin-point problematic concepts and problems that are focused on in these meetings. During this time a new math course, Math 118, Finite Mathematics, was introduced. These meetings were essential in preparing tutors to be able to help students taking this course when the tutors themselves had never taken this course. A training course was designed and implemented for the tutors so that the math lab could service the students in this class.

We now have modules every other week where the tutors go through three levels of training on just tutoring methods. During these lessons we discuss various subjects of tutoring and how we can apply them in the Math Lab to help the students we service. Some of the topics covered are communication and listening skills, brain dominance, critical thinking, ethics, memory, and test anxiety. In the summer of 2012 we submitted this program to CRLA to be recognized as a certified tutor-training program.

About five years ago, we switched how students were able to ask for help. In the past we used a method were students would come into the math lab and sit at any table and if they had any questions they would put a stick up and then a tutor would come around to help them. This caused many problems as the Math Lab started to grow. Unknowingly, tutors would miss students who had been there for a while with a stick up. Now we switched to a sign-up sheet. This has helped us ensure a first-come, first-served policy. It has also provided a way to collect very useful data. Since this method was started, we have been able to track data such as classes, section from textbook or online homework, specific problems, date and time of questions, and professors. This has helped us more accurately pin-point the problematic areas that students are having. We have the tutors initial and write down the time they start helping a student and then the time they end. This helps us see what problems take the longest so we can more properly prepare. We are also able to see what hours are the busiest hours so we can decide how many tutors should be on the clock during each hour.

During this time the Math Lab started teaching review sessions for the classes it serviced. A review session or two is taught for each major test during the semester. Also multiple reviews are taught during reading days in preparation for finals. We also created new services such as proctoring exams and collecting and returning homework for professors. During this time we have also tried providing tutoring services for Math 190/290, Fundamentals of Math.

During the 2006 school year, the Math Lab conducted head counts of patrons in the Math Lab, every hour on the half hour. The following chart gives the average of the head counts for the typical weeks of fall semester. During a typical week that semester, the Math Lab was open for 62 hours. The number of student employees in the Math Lab that semester was 67; if they worked an average of 10–12 hours per week, then there were an average of 11–13 employees present each hour, including secretaries. Of course, more tutors were scheduled during the busier hours, but it is evident that they were kept busy.

If the numbers in the following chart are added up, it tells us that 4560 students were counted in an average week, though of course many students were counted several times. That yields an average of 74 students per hour in the Math Lab any hour it was open. Also, given that total enrollment in math classes in a fall semester was about 4500, it is clear that a good portion of math students used the Math Lab.
The Math Lab is also a great boon to the students who work as tutors. There is no better way to learn the material than to teach it to someone else!

**Comments by the Current Chair**

![Image of Robin Roundy](image_url)

**Robin Roundy** joined the faculty of the Department of Mathematics in 2010. He received his BS and MS degrees from BYU in 1978 and 1980 and his PhD from Stanford in 1984. He received the Orson Pratt Prize at BYU in 1978. His specialty is Operations Research and optimization. Before coming to BYU, he was professor of mathematics at Cornell University. He was appointed chair of the department in 2012.

**Comments by Dr. Robin O. Roundy**

Currently, the Mathematics Department is doing very well. In terms of providing quality education, we note that 46% of our 2012 B.S. graduates in mathematics are currently enrolled in graduate programs. In each of the last four years BYU’s mathematics department has placed in the top 25 in the prestigious Putnam Competition. This year we are optimistic

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<tr>
<th>Fall 2006 Math Lab Head Count Average</th>
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<td>Monday</td>
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<td>8:30</td>
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that we will crack the top 10 for the first time ever. Our B.S. graduates are all required to take either the Mathematics subject test of the GRE or the Major Field Test administered by ETS. 320 universities participate in the MFT. Presumably, our stronger students do not take the MFT. In spite of that, BYU’s average score on the MFT is in the 99th percentile. All of these indicators show that we are doing very well in educating undergraduates. We have also increased the size of the graduate program in mathematics. Our graduate students are playing an increasingly important role in the department. Key indicators of research productivity have improved significantly during the last six years.

Under the previous Chair, Tyler Jarvis, we have established a number of goals. In the future, for the most part we will continue to progress in the directions that have already been defined.

Our most crucial focus in the next few years is probably hiring new faculty members. During the next 8 years, depending on retirements and other factors, we are likely to hire as many as 11 new faculty members. This is approximately one third of the department. Fortunately, in recent years we have been sending a strong group of LDS students to graduate schools in mathematics. We anticipate that a number of these students will be available and qualified to become permanent faculty members at BYU.

A second goal that is crucial to us is the successful implementation of the Applied and Computational Mathematics Emphasis (ACME). The curriculum is designed from scratch and is fundamentally different from any other existing degree program. We have a goal of completing textbooks for 8 new three-credit-hour courses, and 8 new 1-credit-hour lab courses, by October of 2014. Jeff Humphreys is the lead on this ambitious writing project. Tyler Jarvis has agreed to co-author the books for the first 4 courses, and is actively involved at present. Graduate students are also helping, and other faculty members may well get involved at some point in the future. Faculty members will need to prepare themselves to teach the new courses.

In the next few years we will work to improve the number and quality of jobs that are available to graduates of the mathematics department who choose not to enroll in graduate school. Internships and mentoring will be important in that regard. To accomplish this we will work to improve our contacts with corporations, alumni and other influential people.

Under the able leadership of David Wright, and with the active participation of a growing number of faculty members, we have strengthened our involvement in improving secondary and primary education in mathematics, and the visibility of BYU’s Department of Mathematics in high schools. We intend to continue and, in some ways, to expand these valuable activities.

The faculty members in the mathematics department are proud of what we have accomplished in recent years, and are excited about the future.
Bibliography

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Harold B. Lee Library Organizational History Project:
https://www.lib.byu.edu/byuorg/index.php/Main_Page
then search for: Brigham Young University. Dept. of Mathematics
Brigham Young University. Dept. of Mathematics (1904-1909)
Brigham Young University. Dept. of Mathematics and Physics
Church Teachers College. Dept. of Mathematics
Church Teachers College. Dept. of Mathematics and Physics

Maeser, Karl G., “A Retrospect.”


Appendix 1. Timeline

This is a list of events involving or affecting the Department of Mathematics at Brigham Young University, placing the department in the context of the development and growth of the university. This information is taken from various sources, primarily university catalogs.

1875—Brigham Young Academy is founded by Brigham Young on 19 October 1875.

1878—The Academic Department is formed and includes mathematics courses.

1885—A room in the ZCMI building was fitted out for mathematics.

1891—The Physical and Natural Sciences Department houses mathematics.

1895—The Natural Sciences Department houses mathematics.

1896—The LDS Church takes over financial responsibility for the Brigham Young Academy.

1897—The Collegiate Department is created to house the higher education programs and courses, including mathematics.

1902—The Department of Science houses the Department of Mathematics.

1902—Post-high school mathematics courses are listed as being in the Department of Mathematics.

1903—Brigham Young Academy becomes Brigham Young University.

1904—The College replaces the Collegiate Department.

1904—The Department of Mathematics is listed as one of the departments in the College.

1906–1909—John C. Swenson is dean of the College.

1906–1907—Ernest D. Partridge is chairman of the Department of Mathematics.

1907–1911—William F. Ward is chairman of the Department of Mathematics.

1909—The College becomes the Church Teachers College, concentrating all college-level efforts in the Church Educational System here and focusing its mission on training high school educators. All College departments are absorbed into the Church Teachers College.

1909–1913—Henry Peterson is dean of the Teachers College.

1911–1912—Chester Snow is chairman of the Department of Mathematics.

1911—The Maeser Memorial Building is opened as the first building of the Church Teachers College.

1912–1913—William F. Ward is chairman of the Department of Mathematics.

1913–1914—Andrew S. Gibbons is chairman of the Department of Mathematics.

1913–1915—Edwin S. Hinckley is dean of the Teachers College.

1914–1916—Harvey Fletcher is chairman of the Department of Mathematics.

1915–1920—Amos N. Merrill is dean of the Teachers College.

1916–1919—Carl F. Eyring is chairman of the Department of Mathematics.

1919—The Department of Mathematics is combined with the Department of Physics.
1919–1921—Carl F. Eyring is chairman of the Department of Physics and Mathematics.

1920—The Church Teachers College is split and the Department of Mathematics and Physics is placed in the School of Arts and Sciences.

1920–1925—Martin E. Henderson is dean of the School of Arts and Sciences.

1920—The transition from a semester calendar to a quarter calendar is made.

1921—The School of Arts and Sciences is changed into the College of Arts and Sciences.

1921—The Department of Mathematics and Physics is split into the Department of Mathematics and the Department of Physics and they are both placed in the College of Arts and Sciences.

1921–1929—Carl F. Eyring is chairman of the Department of Mathematics.

1925–1951—Carl F. Eyring is dean of the College of Arts and Sciences.

1925—The Heber J. Grant Library is completed.


1931–1937—Carl F. Eyring is chairman of the Department of Mathematics.

1938—Milton Marshall is chairman of the Department of Mathematics.

1939–1951—Carl F. Eyring is chairman of the Department of Mathematics.

1949—The first B. S. degree in Mathematics is recorded.

1951–1954—George H. Hansen is dean of the College of Arts and Sciences.

1951–1953—Milton Marshall is chairman of the combined Department of Physics and Mathematics.

1953—The Department of Mathematics is separated from the Department of Physics again.


1954—The College of Arts and Sciences is split and the Department of Mathematics is placed in the College of Physical and Engineering Sciences.

1954—The first B. A. degree in Mathematics is awarded.

1954–1958—Harvey Fletcher is dean of the College of Physical and Engineering Sciences.

1957—The first M. S. degree in Mathematics is awarded.

1958–1961—Harvey J. Fletcher is chairman of the Department of Mathematics.


1960—The transition is made from a quarter calendar back to a semester calendar.

1960—The Department of Statistics is created, with Howard C. Nielson as chairman.


1962–1963—Harvey J. Fletcher is chairman of the Department of Mathematics.

1964–1978—Kenneth L. Hillam is chairman of the Department of Mathematics.

1966—The Harold B. Lee Library is completed.
1966—The first M. A. degree in Mathematics is awarded.

1969—The Department of Computer Science is created, with C. Edwin Dean as chairman.

1971—The Talmage Mathematics/Computer Building is completed.

1972—The university transitions to the “4-4-2-2” calendar consisting of Fall Semester, Winter Semester, Spring Term, and Summer Term.

1973—The College of Physical and Engineering Sciences is split and the Department of Mathematics is placed in the College of Physical and Mathematical Sciences.


1975—The Math Lab begins as an office with two tutors in the Talmage Building.

1976—The Math Lab joins the General Education Lab in the Harold B. Lee Library.

1978–1990—Peter L. Crawley is chairman of the Department of Mathematics.


1979—The Math lab moves to the Knight Mangum Building.


1986–1993—Grant W. Mason is dean of the College of Physical and Mathematical Sciences.

1990–1993—Donald W. Robinson is chairman of the Department of Mathematics.


1993—The first Ph. D. degree in Mathematics is awarded.


2000—The Department of Mathematics Education is created, with Gerald M. Armstrong as chairman.

2000–2006—Lynn E. Garner is chairman of the Department of Mathematics.

2002—The Math Lab moves to the Talmage Building.

2006–2012—Tyler J. Jarvis is chairman of the Department of Mathematics.

2008–present—Scott Sommerfeldt is dean of the College of Physical and Mathematical Sciences.

2012–present—Robin Roundy is chairman of the Department of Mathematics.
Appendix 2. Faculty Profiles

Here are listed all who were designated in the catalogs as teachers of mathematics. The years following their names give the dates of their assignment to the Department of Mathematics. Included are degrees obtained and rank advancements, insofar as they are known. At the end is a picture roster of the current permanent faculty.

Allred, Kenneth (1938–1941)  
BA, BYU, 1938. Instr, 1938


Baker, Roger C. (1990–present)  

Bakker, Lennard Frank (1999–present)  

Barrett, Wayne Walton (1980–present)  


Booth, A. L. (1886)  

Booth, John E. (1876–1880)  


Cardon, David A. (1998–present)  

Chahal, Jasbir S. (1981–present)  

Chamberlain, William H. (1914–1915)  
MA. Prof, 1914

Chow, Shue-Sum (1998–present)

Christensen, Carl J. (1925–1927)
  BS, BYU, 1923; MS, U of Wisconsin, 1925. Instr, 1925


Conner, Gregory R. (1992–present)

Cluff, Benjamin Jr. (1884–1886, 1892–1893)
  BS, U of Michigan, 1890.

Crawley, Peter L. (1971–1999)

Dallon, John (1999–present)

Dean, C. Edwin (1949–1969)


Dorff, Michael (2000–present)

Doud, Darrin M. (2001–present)

Egbert, Russell (1963–1970)

Eyring, Carl F. (1910–1951)
  BA, BYU, 1912; MA, U of Wisconsin, 1915; PhD, CalTech, 1923. Asst, 1910; Instr, 1912; Asst Prof, 1915; Prof, 1917

Fearnley, Lawrence (1958–present)

Fisher, Todd (2007–present)

Fletcher, Harvey (1913–1916, 1951–1958)
  BS, BYU, 1907; PhD, U of Chicago, 1911. Prof, 1914

Fletcher, Harvey J. (1953–1992)
  BS, MIT, 1944; MS, CalTech, 1948; PhD, U of Utah, 1953. Instr, 1953; Asst Prof, 1955; Assoc Prof, 1957; Prof, 1962.
Ferguson, Helaman Rolf Pratt (1971–1991)


Gibbons, Andrew S. (1913–1914)
    BA. Prof, 1913

Gill, Gurcharan S. (1960–1999)

Glasgow, Scott (2000–present)

Gowans, Ephraim (1892–1893)

Grant, Christopher P. (1993–present)

Hales, Wayne B. (1930–1955)
    BA, BYU, 1916; MA, U of Utah, 1922; PhD, CalTech, 1926. Assoc Prof, 1930; Prof, 1938

Halverson, Denise M. (2001–present)


Hayes, John E. (1915–1919)
    Instr, 1915


Hone, Shirl J. (1961–1966)

Horne, Joseph L. (1897–1903)
    Instr, 1897; Asst Prof, 1902


Humpherys, Jeffrey C. (2005–present)

Humphries, Stephen P. (1987–present)

Hurd, Royal (1967–1979)

    BS, BYU, 1957; PhD, U of Utah, 1965. Asst Prof, 1966; Assoc Prof, 1968; Prof, 1972.

Jarvis, Clarence S. (1902–1908)
    BS, Instr, 1902; Asst Prof, 1906.

Jarvis, Tyler (1996–present)

Jenkins, Paul M. (2009–present)
    BS, MS, BYU, 2000, 2002; PhD, U of Wisconsin (Madison), 2006. Asst Prof, 2009.

Karst, Edgar (1959–1962)

Kuttler, Kenneth L. (1999–present)
    BS, MS, BYU, 1974, 1976; PhD, U of Texas (Austin), 1981. Visiting Asst Prof, 1993; Prof, 1999.


Lang, William E. (1989–present)


Li, Xan-Jin (2001–present)
    BS, Hunan Normal U, 1982; MS, Academia Sinica (Beijing), 1985; PhD, Purdue U, 1993. Visiting Asst Prof, 1999; Asst Prof, 2001; Assoc Prof, 2006.
Lu, Kening (1990–present)


Maeser, Sherman (1916–1919)
   BA. Instr, 1916; Asst Prof, 1917

Marshall, Milton (1919–1957)
   BA, BYU, 1918; PhD, U of Chicago, 1924. Instr, 1919; Asst Prof, 1924; Assoc Prof, 1927; Prof, 1930.

McKay, Steven M. (1994–present)

McKendrick, Wilford (1892–1893)

McKendrick, William M. (1893–1899)

McNamara, D. Harold (1956–1959)
   BS, PhD, U of California (Berkeley), 1947, 1950. Asst Prof, 1956.

Miles, Gail P. (1965–1967)
   Instr, 1966.

Miller, Martin L. (1946–1956)
   BA, BYU, 1942; MA, BYU, 1950. Instr, 1946; Asst Prof 1954

   BS, MS, U of Utah, 1952, 1957; PhD, U of California (Santa Barbara), 1967. Asst Prof, 1962; Assoc Prof, 1968; Prof, 1972.


Nielsen, Pace (2010–present)
   BS, BYU, 2001; PhD, U of California (Berkeley), 2006. Asst Prof, 2010.

Olpin, A. Ray (1923–1924)
   BA, BYU, 1923; PhD, Columbia U, 1930. Instr, 1923

Olpin, J. Lloyd (1956–1975)
   BS, BYU, 1925; MS, U of Colorado, 1938. Asst Prof, 1956; Assoc Prof, 1966.

Ouyang, Tiancheng (1992–present)

Pack, Mosher F. (1903–1906)
   BS. Instr, 1903

Partridge, Ernest D. (1897–1910)
   BS, Michigan State U, 1898; DB. Prof 1901
Partridge, Raymond (1905–1912)
  Instr, 1905

Peterson, Gerald E. (1965–1968)

Peterson, Blake (1996–2000)

Peterson, Hugh W. (1927–1928)
  BA, BYU, 1916; MS, Columbia U, 1926. Instr, 1927

Peterson, John Milo (1965–1998)


Purcell, Jessica (2008–present)

Rencher, Alvin C. (1963–1965)

  BS, MA, U of Utah, 1948, 1952; PhD, Case Institute, 1956. Asst Prof, 1957; Assoc Prof, 1959; Prof, 1964.

Roundy, Robin O. (2010–present)

Skarda, R. Vencil (1965–2005)

Smith, William V. (1985–present)

Snow, Chester (1911–1912)
  BA. Prof, 1911

Snow, Donald Ray (1969–2001)


Stahel, Andreas (1990–1995)


Tanner, Joseph M. (1880–1882)
Tolman, L. Kirk (1965–2012)
BS, MS, BYU, 1960, 1961; PhD, U of New Mexico, 1972. Asst Prof, 1966; Assoc Prof, 1981.

Villamizar, Vianey (2000–present)


Ward, William F. (1900–1913)
BS. Instr, 1901; Asst Prof, 1902; Prof, 1907

Webb, Delbert (1914–1916)
Instr, 1914


Williams, Stewart (1923–1924)
BA. Instr, 1923

Wright, David G. (1983–present)

Wynn, Jan Eugene (1966–2000)

Yearout, Paul H. (1962–1990)
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Appendix 3. Faculty Publications

In his 1972 History of the Mathematics Department, J. Lloyd Olpin lists the publications of the members of the department at that time. We include that listing here.

Publications of BYU Mathematics Faculty Members

The following list of publications of the members of the Mathematics Faculty may not be complete but is as complete as we were able to get it in July of 1972.

GERALD M. ARMSTRONG

ROBERT C. BURTON
3. “An Application of Convex Sets to the Construction of Error Correcting Codes and Factorial Designs,” University of North Carolina Institute of Statistics Mimeo Series No. 393, June, 1964 (This is the author’s doctoral dissertation.)
4. (With R. C. Bose) “A theorem in finite geometry and the uniqueness of the Hamming and the MacDonald codes,” (submitted for publication)
5. “Iterated bounds for error correcting codes,” (submitted for publication)
6. “A class of minimum redundancy codes,” (to be submitted for publication)
7. “An extension of the Johnson bound,” (to be submitted for publication)
The last four papers are extensions of work in the author’s dissertation and are being submitted to technical journals.

DOUGLAS M. CAMPBELL

PETER CRAWLEY
19. (With R. P. Dilworth) Algebraic Theory of Lattices [a graduate/ reference level text to be published by Prentice-Hall in the fall 1972.]

**LAWRENCE FEARNLEY**
11. “Inverse limits and the fundamental commutativity property”, in process of publication.

**LYNN GARNER**

**G. S. GILL**

**RICHARD HANSEN**
1. A Theoretical Look at Reducing Truncation Errors, submitted to Comm. ACM.

**KENNETH L. HILLAM**
JACK W. LAMOREAUX

KENNETH M. LARSEN

HAL G. MOORE

JOHN M. PETERSON

DONALD W. ROBINSON
1. Technical reports, sponsored and printed by the Office of Naval Research, Explosives Research Group, University of Utah, 1950-1952, Contract 57 onr-45107
   3) Velocity of detonation in “ideal” explosives with inert additives, (confidential)
   4) Detonation velocities of “ideal” explosives with inert additives.
   5) Curvature perturbation of the equation of continuity, (confidential).
   34-35.
   412-416
   Applications
   Algebra and Its Applications.
23. “Iteration of the Modular Period of a Second Order Linear Recurrent Sequence,” (research done this
   academic year, and should soon be ready for publication.)
DONALD R. SNOW

LeROY H. W ALKER

JOHN C. HIGGINS

HARVEY J. FLETCHER
<table>
<thead>
<tr>
<th>No.</th>
<th>Reference</th>
</tr>
</thead>
</table>

Here are listed publications by faculty of the Department of Mathematics, insofar as the information was available, as of 2012. In most cases, they are taken from the vitae of the members; in other cases, they have been reconstructed from records such as annual reports. Publications of both permanent faculty and visiting faculty are shown.

**Anderson, Matthew**


**Armstrong, Gerald M.**

3. (with Jack Lamoreaux), Parametric Derivatives are Gauge Integrable, *Real Analysis Exchange*; submitted
4. Reform Calculus at BYU; in preparation
6. A cooperative graduate program for inservice mathematics teachers, submitted.
7. (with Lynn Garner and Jan Wynn) Our Experience with Two Reformed Calculus Programs, *PRIMUS*, IV(4) 301-311.

**Baker, Roger C.**

43. Petites Solutions des Congruences, Séminaire de Théorie des Nombres de Bordeaux (1982-83), exposé no. 37.
96. Numbers in a given set with (or without) a large prime factor in a given set, Ramanujan J., 20 (2009), 275–295.

Bakker, Lennard F.


Barrett, Wayne W.


**Bates, Peter W.**


11. Solutions to the nonautonomous bistable equation with specified Morse Index, accepted


15. (with J. Xun) Metastable patterns for the Cahn-Hilliard equation II: Invariant manifolds and layer dynamics, to appear *J. Differential Equations*.


24. Peter W. Bates and Xiaofeng Ren, “Heteroclinic orbits for a higher order phase transition problem,” 

Brady, Thomas G.

Cannon, James W.

Publications from MathSciNet, July 14, 2009
11. MR0314037 (47 #2589) Cannon, J. W. ULC properties in neighbourhoods of embedded surfaces and


Other Scholarly Publications
3. Expository work for the Mathematical Intelligencer (a popular mathematics magazine):

Cardon, David C.
4. David A. Cardon and Adam Rich, Turan inequalities and subtraction-free expressions, JIPAM. J.

Chahal, Jasbir S.

1. J.S. Chahal, Roots of unity as eigenvalues of circulant matrices and application to permutation polynomials, submitted for publication.

Chatterley, Louis J.

4. (with Donald M. Peck) Helping Children to a Useful Meaning for Equality, submitted to *Arithmetic Teacher*

**Chen, Xinfu**
4. Spectrums of the Allen-Cahn, Cahn-Hilliard, and phase-field equations for generic interface, submitted to *Comm. in PDE.*

**Chow, Shue-Sum**

**Refereed Publications:**
26. S.-S. Chow, Finite Element Error Estimates for Nonlinear Elliptic Problems of Monotone Type, PhD Thesis, Department of Mathematics, Faculty of Science, Australia National University, April, 1983.

Non-Refereed Publications:

Clark, David A.
2. Non-Galois Cubic Fields which are Euclidean but not Norm-Euclidean, conditionally accepted for publication by Mathematics of Computation; revised version submitted.


Conner, Gregory R.

To appear/in press


Published


13. G. R. Conner, Hanspeter Fischer, The fundamental group of a visual boundary versus the fundamental group at infinity, Topology and its Applications 129 (2003), no. 1, 73–78


Crawley, Peter L.

Dallon, John C.

**Daners, Daniel**


**Doud, Darrin**

1. Darrin Doud, A procedure to calculate torsion of elliptic curves over Q, Manuscripta Mathematica, 95 (1998), 463—469.
2. Darrin Doud, $S_4$ and $S^4$ extensions of Q ramified at only one prime, Journal of Number Theory, 75 (1999), 185—197.


Dorff, Michael


**Fearnley, Lawrence**


**Mathematical-Physics Papers**

L. Fearnley, with co-authors from the Proceedings of the Utah Academy of Science, Arts, and Letters.

1. “Global characteristics of the vector field of the Topolotron”.
2. “Uniqueness of the Topolotron design relative to structural stability”.
3. “Topological global stability of the Topolotron”.
4. “The Topolotron, a device for the magnetic confinement of plasmas”.
5. “Numerical methods for solving Stokes equation with application to the Topolotron”.
6. “Physical realizability of the Topolotron configuration”.

**More Mathematical Research Papers**

1. L. Fearnley, with David L. Fearnley and J.W. Lamoreaux, “There are no $F_\sigma$ n-point sets in $R^m$, Bulletin of the Australian Mathematical Society, 72 (3) (2005).

**Fisher, Todd**

1. Topological properties of invariant sets for Anosov maps with holes, joint work with Skyler Simmons, submitted.
2. Entropic stability beyond partial hyperbolicity, joint work with Jérôme Buzzi, submitted.

Forcade, Rodney W.
1. Constructing cluster expansions for arbitrary lattices with minimal user-input, Modeling and Simulation in Materials Science and Engineering, 17 (2009).
7. FORCADE, RODNEY: Comparing the two main algorithms for integer-linear- relation detection, one of main Journals of Computational Math, submitted.
8. RODNEY FORCADE and others (classified) Classified, internal U.S. government (NSA, etc.)

Garbe, Douglas G.

Garner, Lynn E.
4. A real place on a real number field is trivial. Proceedings of the American Mathematical Society, 49(1975), 519.

**Gill, Gurcharan S.**

**Glasgow, Scott A.**

**Peer-Reviewed Publications**

**Other Publications**

154

**Grant, Christopher P.**

Halverson, Denise M.

1. D. M. Halverson, D. Repovš, Detecting codimension one manifold factors with the piecewise disjoint arc-disc property and related properties, submitted for publication.

Humpherys, Jeffrey

Selected Journal Papers

(1986), 532--556.
23. 'Weak Cayley Table Groups,' Journal of Algebra volume 216 (1999) 135-158.
27. 'Intersection number operators for curves on discs and Chebychev Polynomials,' Knots, Braids and Mapping Class Groups (2001) 49-75.
28. 'Intersection number operators for curves on discs II,' Geometriae Dedicata. 2001.
31. 'Hurwitz action on Artin groups' Israel Math J. vol 143 (2004) 189-222
33. Braid groups and Aut(F2) are not rigid’ Contemp. Math. 360 51-54 (2005)
34. “An action of subgroups of Mapping Class Groups on polynomial Algebras”, Top. and its applications 154 (2007), no. 6, 1053--1083
42. (with Zane Li.) ‘Counting Powers of words in monoids’ European Journal of Combinatorics Volume 30 (2009) pages 1297-1308
43. ‘Intersection theories and Chebyshev polynomials III’ J of Algebra and its Applications Volume 8 Number 1 2009, pages 53-81.
44. ‘Fusions of character tables II: p-groups’ Commun. In Algebra, Volume 37, 4296- 4315 (2009)
45. ‘Finite index subgroups of free groups and braid groups generated by conjugates of powers of the generators’ J. of Group theory Volume 12 Number 3 2009, pages 465 -485.

Jarvis, Tyler J.

Peer Reviewed Mathematical publications.


### Other Mathematical Publications.


### Posted preprints and submitted manuscripts.


### Jenkins Paul M.,


### Kuttler, Kenneth L., Jr.

14. Initial Boundary Value Problems for the Equation $u_{tt} = (\alpha(u_x)u_{xt})_x + \sigma(u_x)_x + f$, with D. L. Hicks, Quarterly of Applied Math, Vol. 46, No. 3 (1988), pp. 393–407.
42. Vibrations of a Beam in contact with two stops. with Shillor Dynamics of Continuous, Discrete and Impulsive Systems, 8 (2001) no. 1 93–110.
50. Analysis and Simulations of Vibrations of a Beam with
70. A dynamic thermoviscoelastic problem: An existence and uniqueness result. With Fernandez. To appear in Nonlinear Analysis. (This one makes use of my results for time dependent families of subgradients.)

Lamoreaux, Jack W.
1. (with G. Armstrong) Parametric Derivatives are Gauge Integrable, submitted to Real Analysis Exchange

Lang, William E.
17. (with Tyler Jarvis, Nansen Petrosyan, Gretchen Rimmasch, Julie Rogers, and Erin Summers) Classification of singular fibres on rational elliptic surfaces in characteristic three, Communications in Algebra 33 (2005), 4533–4566.

Lawlor, Gary R.
1. Dorff, Rebecca; Lawlor, Gary; Sampson, Donald; Wilson, Brandon. Proof of the planar double bubble conjecture using metacalibration methods. Involve 2 (2009), no. 5, 611–628.
Li, Xian-Jin


Lu, Kening


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**Lundquist, Michael E.**


Marichal, Jean-Luc

McKay, Steven M.

Miklyukov, Vladimir

Moore, Hal G.
3. (with Adil Yaqub) Generalized n-potent rings, submitted to *Okayama Journal* (Japan)

**Myerson, Gerald**


**Nielsen, Pace P.**


**Ouyang, Tiancheng**

1. Ouyang, Tiancheng and Yan, Duokui New Developments in Regularization of Simultaneous Binary Collision in the Collinear Four-Body Problem Submitted to Archive of Rational Mechanics and Analysis in 2012
2. Ouyang, Tiancheng; Yan, Duokui; Simmons, Skyler Solutions with Singularities in two dimensions in the n-body problem Rocky Mountain Journal of Mathematics to be appear in 2013
31. Philip Korman and Tiancheng Ouyang, Exact multiplicity results for two classes of boundary value problems, Differential Integral Equations 6 (1993), no. 6, 1507–1517.
34. Tiancheng Ouyang and Junping Shi, Exact multiplicity of solutions and global bifurcation of $\Delta u + \lambda f(u) = 0$, Differential equations and applications (Hangzhou, 1996), 356–363.

Peterson, Blake

Peterson, Dale

Peterson, John Milo
2. Rational Numbers: a little groundwork can go a long way, submitted to The Arithmetic Teacher, NCTM.
8. Your attitude comes through--Loud and clear, A study of the effect on students of teacher attitudes toward mathematics, Teaching K-8, submitted.

Pollington, Andrew D.
10. Sum sets and U-numbers, Number Theory with an Emphasis on the Markoff Spectrum
18. (with Flatto and J. Lagarias) On the range of fractional parts −(p/q), submitted.

**Purcell, Jessica S.**

**Publications**

Papers Under Review


Robinson, Donald W.

27. “Lower bounds on the dimension of the space of matrices transposed by a similarity transformation,” Linear and Multilinear Algebra 3 (1975), 135–141.

Roundy, Robin O.

Publications


174

**Under Review**

**Smith, William V.**
1. (with O. Arino) Larval fish populations in media subject to thermoclines and fluid motion effects with diffusion, in preparation.
18. Differential operators in Banach Spaces with locally defined spectral measures, Houston J. Math. 8 No. 3 (1982).

**Snow, Donald R.**

1. A slick new way to get the sums of the powers formulas, to be submitted to *American Math Monthly*.

**Speiser, Robert D.**

5. (with Arrondo and Sols) Global moduli for contacts, submitted to the *Journal of Algebraic Geometry*.

**Stahel, Andreas**


**Stanger, Adrian**


**Swenson, Eric L.**

2. Boundaries and JSJ decompositions of CAT(0)-groups with P Papasoglu, *GAFA* 19 (2009) 558-590
4. Recognizing constant curvature discrete groups in Dim. 3
8. Convergence groups from subgroups *Geometry and Topology*, vol. 6 (2002) 649-655
11. On Cyclic CAT(0) Domains of Discontinuity Submitted to Groups, Geometry and Dynamics

**Tolman, L. Kirk**


**Villamizar, Vianey**


Walter, Charles N.

Wang, Bixiang
5. Anibal Rodriguez-Bernal, Bixiang Wang, “Reduction of dimensions of approximate inertial manifolds
1669.
9. Horst Lange, Bixiang Wang, “Regularity of attractors for the Klein-Gordon- Schrodinger equation,”

Wight, Theodore A.
1. “Implications of the Secondary School Mathematics Curriculum Improvement Study on Teacher
Training Programs at Brigham Young University,” research paper presented at the NCTM National
Convention at Austin, Texas, April 1973.
2. Article written at the invitation of “Key Curriculum” and COMAP (Consortium for Mathematics and
its Applications Project) on the uses of The Geometer’s Sketchpad with student teachers, to be
published fall 1993.
3. A Symphony of Psalms--Developing as a Teacher of Mathematics, submitted to NCTM and John
Dossey.

Williams, Steven R.
1. Mathematics and being in the world: Toward an interpretive framework, For the Learning of
2. Some common themes and uncommon directions, in T.A. Romberg, E. Fennema and T.P. Carpenter
(Eds.), Integrating research on the graphical representation of function (313-337), Hillsdale, NJ:
Lawrence Erlbaum Associates.
3. (with K.M.C. Ivey) Affective assessment and mathematics classroom engagement: A case study,
submitted to Teachers’ College Record.
4. (with J.A. Baxter) Reconstructing constructivism: The dilemmas of discourse oriented teaching,
submitted to The Elementary School Journal.
5. Steven Williams and Sharon Walen, “Heidegger and hall duty: using vignettes of teacher’s daily
practice to triangulate observational data,” in D. T. Owens, M. K. Reed and G. M. Millsaps (Eds.),
Proceedings of the Seventeenth Annual Meeting of the North American Chapter of the International
6. Steven Williams, Sharon Walen and Hylie T. Barton, “Dollars and sense: A case of distributed

Wright, David G.

Publications
7. AR’s which contain only trivial ANR’s, Houston J. of Math. 4 (1978), 121–127.
9. A decomposition of E^n (n ≥ 3) into points and a null sequence of cellular sets, General Topology and
its Appl. 10 (1979), 297–304.
11. (with L. D. Loveland) Codimension one spheres in R^n with double tangent balls, Topology and its

Conference Proceedings
Wynn, Jan E


Appendix 4. Visiting Faculty

1971: Peter L. Crawley
1980: Wayne W. Barrett
1984: Robert D. Speiser
1986: Nicholas Alikakos, Paul Fife
1988: William Lang, Stein Arild Stromme, Lawrence Bin
Fall 1990: Roger C. Baker, Grigori Kolesnik, Gerald Myerson, Walter Parry
Winter 1991: Frederick Tinsley, William Moran, Gerald Myerson, Grigori Kolesnik
Fall 1991: Roger Baker, Grigori Kolesnik, Gerry Myerson, Walter Parry
Spring 1991: Peter Shiue
Summer 1991: Lawrence Gray
Winter 1992: Xinfu Chen, Steven McKay, Toshiyuki Ogawa
Fall 1992: E. Norman Dancer, Peter Hess, David Olson, Andreas Stahel, Thomas C. Brady, Xu-Yan Chen, Stephen A. DiPippo, David Olson
1993: Ovide Arino, Thomas C. Brady, Kenneth L. Kuttler, Steven McKay, Janos Pintz.
Spring/Summer 1994: Jaap Top, Mohamed Messaoudene.
Fall 1994: Ivan Clarke, Reinhard Franz, Xiaofeng Ren, Donald Sinex, Eric Swenson.
Winter 1995: Ivan Clarke, Reinhard Franz, Xiaofeng Ren, Donald Sinex, Eric Swenson, Micah Wheatley
Fall 1995: Ann Cox, Reinhard Franz, Karl Hales, Michael Kerckhove, Thomas Maxwell, Xingbin Pan, Leslee Pelton, Beth Verbanatz, Bobby Winters
Winter 1996: Ann Cox, Reinhard Franz, Karl Hales, Michael Kerckhove, Thomas Maxwell, Xingbin Pan, Leslee Pelton, Bobby Winters
Summer 1998: Edward Allen, Kent Bessey, Jaap Top, Arkady Vaintrob, Bobby Winters

Fall 2000: Nicholas Alikakos, Kathryn Andrist, Lennard Bakker, Lori Carmack, Artur Elezi, Denise Halverson, Laurel Howard, Xian-Jin Li, Vianey Villamizar


Winter 2002: Artur Elezi, Gro Hovhannisyan, Laurel Howard, Jean-Luc Marichal, Adrian Stanger, and Yumei Wu

Fall 2002: Laurel Howard, Jean-Luc Marichal, Adrian Stanger, Jong Min Kim, and Yumei Wu

Winter 2003: Laurel Howard, Jean-Luc Marichal, and Adrian Stanger

Fall 2003: Ovide Arino, Thomas C. Brady, Kenneth L. Kuttler, Steven McKay, Janos Pintz, Brandon Baker, Tarlok Shorey, Adrian Stanger, Tom Hawkins, Diane Mueser

Winter 2004: Brandon Baker; Tarlok Shorey; Adrian Stanger, Tom Hawkins and Diane Mueser

Fall 2004: Brandon Baker; Tarlok Shorey; Adrian Stanger, Weigu; Millett, Celeste; Olson, Keith Sakuma, Kazuhiro


Fall 2005: Kent, Thomas; Milligan, Thomas

(Visiting Faculty, Scientists and post doctoral students)

Peidong Liu, January – April, worked with Kening Lu; Millett, Celeste January – April; Sakuma, Kazuhiro January – April; Kent, Thomas U. of Wisc.; Madison Sept. – Dec.; Milligan, Thomas BYU-Idaho Sept. – Dec.

Winter 2006: Thomas Kent, Thomas Milligan, and Ken Johnson

In Fall 2006: Maria Nowak, from Marie-Curie University in Poland, as a one-semester visitor to work with Michael Dorff on a joint research project.

2007

<table>
<thead>
<tr>
<th>Name</th>
<th>Current/Former Employer</th>
<th>Invited by</th>
<th>Length of Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chengzhi Li</td>
<td>Peking University</td>
<td>Kening Lu</td>
<td>Jan–May 2007</td>
</tr>
<tr>
<td>Thomas Milligan</td>
<td>BYU-I</td>
<td>Hiring Committee faculty</td>
<td>Jan–Aug 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2-year temporary faculty)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lausanne</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matthew Anderson</td>
<td>Louisiana State</td>
<td>Hiring Committee faculty</td>
<td>Aug–Dec 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2-year temporary faculty)</td>
<td></td>
</tr>
<tr>
<td>Emma Turner</td>
<td>Wasatch Academy</td>
<td>Hiring Committee faculty</td>
<td>Aug–Dec 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2-year temporary faculty)</td>
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### 2008

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<th>Name</th>
<th>Current/Former Employer</th>
<th>Invited by</th>
<th>Length of Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenyon Platt</td>
<td>Univ. of Georgia</td>
<td>Hiring Committee faculty) (2-year temporary faculty)</td>
<td>Aug–Dec 2008</td>
</tr>
<tr>
<td>Paul Jenkins</td>
<td>UCLA</td>
<td>Tyler Jarvis</td>
<td>Aug–Dec 2008</td>
</tr>
<tr>
<td>Matthew Anderson</td>
<td>Louisiana State</td>
<td>Hiring Committee faculty) (2-year temporary faculty)</td>
<td>Jan–Dec 2008</td>
</tr>
<tr>
<td>Erin Chamberlain</td>
<td>University of Utah</td>
<td>Hiring Committee faculty) (2-year temporary faculty)</td>
<td>Aug–Dec 2008</td>
</tr>
<tr>
<td>Fan Huijun</td>
<td>Peking University</td>
<td>Tyler Jarvis</td>
<td>Mar–Apr 2008</td>
</tr>
<tr>
<td>Marie Jose Garrido-Atienza</td>
<td>Univ. of Sevilla</td>
<td>Todd Fisher</td>
<td>Feb–Mar 2008</td>
</tr>
<tr>
<td>Jana Rodriuez-Hertz</td>
<td>IMERL (Instituto de Matemática) Uruguay</td>
<td>Todd Fisher</td>
<td>Jan-Feb 2008</td>
</tr>
<tr>
<td>Ji Shu</td>
<td>Sichuan Normal U</td>
<td>Kening Lu</td>
<td>July–Aug 2008</td>
</tr>
<tr>
<td>Bjorn Schmalfuss</td>
<td>Univ. Paderborn</td>
<td>Kening Lu</td>
<td>Feb–Mar 2008</td>
</tr>
<tr>
<td>Daoyi Xu</td>
<td>Sichuan University</td>
<td>Kening Lu</td>
<td>May–June 2008</td>
</tr>
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</table>

### Special Year in Topology

The academic year 2008-2009 was a special year in topology at BYU, during which funds were provided to bring leading researchers to BYU and to make BYU a focus for topology. The primary faculty members involved in this special year were Jim Cannon, Greg Conner, Denise Halverson, Steve Humphries, Jessica Purcell, Eric Swenson, and David Wright. Throughout the year, these faculty members were able to develop new collaborations as well as expand existing collaborations with colleagues in the United States and Europe, and to discuss new developments in the field of topology. Special year funds primarily went to support visitors and travel, and also to help BYU host a conference in May.

### Special Year in Mathematical Biology

In 2009–2010 we held a special year in mathematical biology. This involved faculty members John Dallon, Bill Smith, and Kening Lu. For the special year we invited Chuan Xue (Ohio State University), Sanjay Kumar (University of California Berkeley), Jim Keener (University of Utah), Bob Dillon (Washington State University), Thomas Hillen (University of Alberta), Guowei Wei (Michigan State University), Shiugi Ruan (University of Miami), Stephanie Portet (University of Manitoba), Jean Paul Rieu (University Lyon 1), and Philip Maini (Oxford University).

Interacting with the visitors was very helpful during the year. Chuan Xue’s visit has resulted in an ongoing collaboration with John Dallon that should yield a publication by the end of 2011. Chuan Xue is a postdoc at the Ohio State University, working with Dallon on a project to model the motion of epithelial cells in wound healing. The visit of Stephanie Portet and Shiugui Ruan resulted in an invitation for Dallon to speak at a conference in Bordeaux, and helped in obtaining NSF funding to travel to the conference. The visit of Jean Paul Rieu also resulted in a new project, which should lead to a joint publication with Bill Smith, John Dallon, and Jean Paul Rieu. Dr. Rieu works with Dictyostelium discoideum and measures the forces that individual cells and groups of cells exert on the substrate. This is an area of interest for Dr. Dallon. Dr. Rieu, Dr. Dallon, and Dr. Smith are currently working on a paper regarding the forces in a Dictyostelium discoideum slug. Sanjay Kumar’s visit initiated a new project on glioma cells and modeling brain cancer. Dr. Kumar received the Presidential Early Career Award for Scientists and Engineers. Finally, the visit of Philip Maini advanced a collaborative effort on a wound-healing project.
Special Year in Number Theory
The academic year 2010–2011 is a Special Year in Number Theory at BYU, during which funds are being provided to bring leading researchers to BYU to make the university a focus for Number Theory. The primary faculty involved in this special year are Roger Baker, David Cardon, Jasbir Chahal, Darrin Doud, Paul Jenkins, Xian-Jin Li, and Pace Nielsen. During the fall semester of 2010, the many researchers made short visits, discussed problems with faculty and students, gave talks in the Number Theory Seminar, and in two cases (Friedlander, Vaaler) also spoke in the Department Colloquium.

A highlight of the Special Year events for fall was the joint hosting by BYU and UVU of the Western Number Theory Conference from December 15th to the 18th. A large number of 15-minute talks were presented during the conference held at UVU. Presenting at the conference were three BYU undergraduates who presented mentored research results in number theory. Other speakers were established mathematicians from the U.S.A. and Australia, and post-docs and graduate students from the USA, including three BYU graduate students. There were many opportunities for interactions between students and more senior people. One postdoc, Jeremy Rouse (University of Illinois at Urbana-Champaign), worked during this visit on a paper with our own Paul Jenkins. Their paper was submitted and has been strongly recommended by the referee to be accepted.
Appendix 5. Alphabetical List of Graduates

AAA
Aagard, Julie Lewis BA92
Abbasi, Bassam MS96
Abramson, Christopher Robert BS92
Abramson, Mark Aaron BS87
Abramson, Michael Paul BS87, MS89
Aceves, Jennifer Lee BS99
Acor, Ruth Ann BA95
Acord, Burgundi BA95
Acosta, Guillermo Antonio BS98
Acosta, Sebastian Ignacio BS09
Adams, Barbara June BS58
Adams, Carl Richard, Jr. BA74
Adams, David C. MS72
Adams, David Carlos MS88
Adams, Gregory Lynn BS90
Adams, Jeffrey Penrod BS84
Adams, Joseph Allen BS12
Adams, Joseph Neil BS58
Adams, Lori Ann BA87
Adams, Lorraine VanderToolen BA83, MA91
Adams, Lynn Larsen BS80
Adams, Matthew Conrad BS06, MS08
Adams, Richard Allen BS09
Adams, Richard T. BS75
Adams, Steven R. BS08
Adams, Vonae Michelle BA95
Adamson, Candace BS92
Adamson, Michael D. BS82
Afaghi, Peter Ehsanollah BS68
Affleck, Diane BS56
Aitken, Wayne Edward BS85
Aldredge, Jean BA95
Allen, Amy Jo BA97
Allen, Daniel Knight BS85
Allen, Edward Ernest BS85
Allen, Jonathan David BA97
Allen, Mark A. BS07
Allen, Matthew Thomas BS89
Allen, Rachel BA99
Allen, Robert George BS66
Allison, Charles D. MS76
Allred, Blake Burns BS55
Allred, Kathie F. BS73
Allred, Micah Scott BS03
Allred, Wendell U. BS54
Allsop, Lynette Lindstrom BS86
Alred, Nephi David BS97
Amidon, Rebecca Kay BA92
Amott, Erin BS09
Andelin, Steven Lee BS73
Andersen, Michael Steven BS12
Anderson, Betty Fae Buie BS66, MS69
Anderson, Clark MA96
Anderson, David Brent BS81
Anderson, Deborah BA91
Anderson, Edward Lee BS01
Anderson, Emilee Serena BA01
Anderson, Erik Paul BS02
Anderson, Gale Y. BS59
Anderson, Garron Perry BS57, MS61
Anderson, Jeffrey Scott BS94, MS95
Anderson, Jocie Lynel BA94
Anderson, Keri Lynn McEntire BS94, MS95
Anderson, Kimberly BS12
Anderson, Melanie Rose BS08
Anderson, Millie Johnson BA99
Anderson, O. Robert BA72
Anderson, Preston Kent BA75
Anderson, Richard Edgar BS84
Anderson, Robert L. BS95
Anderson, Robert MS05
Anderson, Sheri L. John MS91
Anderson, Stephen Mark BS78
Anderson, Tamigene BA95
Andrews, Christine Lynn BA91
Andrews, Gregory J BS05
Andrews, Karen BA81
Andrews, Kelly Shipp BA98
Andrews, Laura BA94
Andrist, David Michael BS03
Andrist, Kathryn Ann BS93, MS95, PhD00
Andrus, Amy Nicole BA93
Andrus, Ivan MS05
Andrus, Ronald D BS83
Angelos, Bryant W. BS09
Angle, Carol Lynne BA94
Anhalt, Mary Jo Allemen BA63
Apezteguia, Melody Anne BA93
Aragon, Tony D. MA77
Archibald, James K BS81
Armknecht, John Berglund BS87
Armstrong, Diana BS70
Armstrong, Gerald M. BS63, MS65
Armstrong, Lucinda Maughan BS94
Armstrong, Seth Gerald BS90, MS92
Armstrong, Vaughn Scherbel BS75
Armstrong, William Paul BS77
Arnason, Calvin B. BS71
Arnita, Olga M. BA93
Arnold, Charity LaVon BS03
Arnold, Kimberlee Clark BA94
Arnold, Michael Henry BS82
Arnold, Patricia Anne BS82
Arnold, Vicki Horrocks BA94
Arnoldson, Kari BA85
Asay, Chad Benedict BA98
Ashby, Eric Robert BS84
Ashby, Victor Cary BS79
Ashcraft, Michelle Thayne BA86
Ashcroft, Shelley Elaine BA98
Ashton, April BS99
Ashton, James Edward BA93
Ashton, Traci Ann BA98
Ashurst-McGee, Mark Roscoe BS94
Asplund, Matthew Charles BS92
Athay, Darrell G. BS78
Atherton, Jennifer Suzanne BS04
Atkerson, Christine BS60
Atkin, Ashley BS06
Atkisson, Connie Gena BA94
Austin, Carolyn Dee Fisk BS75
Austin, Steven Gregory BS71
Avalos, Lillie Paula BS11
Averett, Kimberly BA96
Aydelotte, Susan Renee McFarland BS94, MS95

BBB
Babiracki, June Irene BS76
Backus, Ellen Jenkins MA92
Bagley, Jean Porter BA92
Bagley, Michelle Rae BA92
Bahen, Gordon BA64
Baier, Erika BS06
Bailey, David H. BS72
Bailey, DuWayne Cole BS63
Bailey, Jed Peterson BS05
Bailey, Michael U. BA74
Bailey, Rebecca Elaine Benson BA96
Bailey, Sean BS07
Bailey, Michael Paul BS05
Bair, Alveretta Grace BS12
Bair, Larry Keith BS69
Baird, Daron Oral BS84
Baird, Margaret Ellen BA73
Baker, Betty-Lu BA80
Baker, Corinne L. BA77
Baker, Jonathan Peter BS10, MS12
Baker, Loyal Alma BS71
Baker, Matthew John BA99
Baker, Tamata Toolson BA74
Baldauf, Martha Marie BS61
Baldwin, Michael R. BA86
Ball, Robert E. BS67
Ballif, Jae Romney BS53
Balmer, Robert Edwin BS06
Banfield, Shelley L. BA94
Bangerter Suezan BS69
Bartholomew, Daniel BS69
Bankhead, John H. BS03
Banks, Clare Chyi-Ling MA97
Barclay, Kristen Valdivieso BA96
Barclay, Melanie Dawn BA95
Barfuss, Marie Aldous BA95
Barker, Blake Hillstead BS07, MS09
Barker, Brent Alan BS77, MS79

Barker, Loree Lee BA95
Barlow, Britney Kay BA95
Barlow, Christopher David BS99
Barlow, Elbert Gene BA67
Barnes, Annette BS70
Barnes, Dann T BS86
Barnes, Jessie Garrett BS02
Barnes, Kenneth Leigh BA78
Barnes, Richard Lee BA86
Barnett, Denise Dalton BS83
Barney, Susan Lynne BS88
Barnhardt, Emma Lucia BS81
Barnum, Rebecca Ann BA91
Barrett, Clark Wayne BS95
Barrick, Jennifer Eldredge BA92
Barrow, Peter A BS11
Barrus, Michael David BS02
Barrus, Michael David BS99
Barrus, Michael David, Jr. MS04
Barson, Dawn Marie BA98
Bartholomew, Robert Lawrence BS80, MS85
Bartle, Duane Lewis BA77
Barton, Hylie T. BS94, MS95
Barton, Judith Kay BS69
Bastow, David Paul BS76
Bateman, John Avon Stoll BA90
Bates, Brandon BS06
Baugh, Steven Clare BS69
Baumann, Duane Emil BA98
Baxter, Jamie BA99
Beardsley, Bruce Marvin BS56
Bearss, Tawnya Grover BA93
Beck, Jennifer BA98
Beckstead, Tara Ward BA00
Beckstrand, Jennifer Gappmayer BS86
Beckstrand, Tana Jo MA94
Bedell, Rachelle Lee BA99
Beecroft, James Lewis BS58
Behunin, Thomas LeRoy BA88
Bekker, Kathryn Klemetson BA94
Bell, Russell Emerson BS98
Bell, Thomas Andrew BS05, MS07
Bellon, Heather Marie BA97
Bellows, Jennifer Lynne BS06
Belnap, Richard Duane BS58
Belt, Chelsey Alayne BA99
Belt, Dustin David BS04, MS06
Belt, Penny Walker BA84
Belue, Paul Thomas BS93
Benedict, Benjamin Showerman, Jr. BA84
Benedict, Timothy D. BA73
Bennett, Cory Randall BA81
Bennett, Daniel Lee BS86
Bennett, David Wallace BS11
Bennett, Douglas Roger BS57
Bennett, Jeffrey Ned BS96
Bennion, Donald Dunlap BS04
Bennion, Inger Catherine BA90
Bennion, Sheryl Ann BA91
Benson, Aaron G BS03
Benson, Lacy P. BA98
Bentley, Kevin J. BS86
Bentz, Jeanine Hansen BS87
Bergaust, Norma Hansen BS03
Bergin, Natalie MS09
Berrigan, Kathleen Ann BA87
Berry, David A. BS85
Berry, Marce Lynn BS89
Berry, Robert Dan MS04
Bessey, Kent Allen BS87, MS89
Bettilyon, Verdon Lee BS71
Beus, Gary Boyd BA62
Beus, H. Lynn BA61
Beveridge, Gregory C. MA95
Biehl, Kenneth John, Jr. BS00
Biehl, Sandra McKinnie BA86
Biggs, Barbara Lynn MA91
Billings, Lowell Edwin BA73
Billings, Melanee Ren BA87
Billings, Victor Dunn BS54
Bills, Barbara N. BA74
Bills, Dale S. BS77
Bills, Dale Seth BA77
Bills, Sheryl Marie BA80
Binch, Wayne George BS59
Bingham, Elizabeth BA99
Bingham, James R. BS59
Bingham, Kama BA91
Bingham, Neil Durrant BS54
Biolo, Wendi Rae BA97
Bird, Elsie L. Rice MA91
Bird, Talmage C., Jr. BS58
Birdsall, Mark William BS77
Birrell, Justin Crayton BS94
Bishop, Bruce Allen BA76
Bishop, F. Avery BS75
Bishop, Pamela Sue Jackson BA96
Bjarnason, Denise Ann BA99
Black, Calvin Lewis BS96
Black, Cheryl M. BS81
Black, Deborah Joan BA75
Black, Kevin John BS86
Black, Stephen T. II BS88
Black, Tamara Anne BA90
Black, Tiffany Thorpe BA87
Black, Winona Fay Pope BS86
Blackham, Diana Lynn BA75
Blackhurst, Johathan H. BS04, MS06
Blackmore, J. Lynne BA88
Blaine, Willis J. BS67
Blake, Racquel Lynn BA93
Blanchard, Carol McCurdy BS91
Blankenagel, Jason K BS10
Blankenship, Valerie J. BA93
Bledsoe, Tina Winter BA97
Bliss, Wendy MA96
Blodgett, Daniel David BS99
Blood, Talman Clifton, Jr. BS68
Bodily, Joshua Davis BS06
Bodine, Jill Coombs BA01
Bodrero, Jonathan Andrew BS97, MS00
Boettcher, Christopher Todd BA94
Bogdan, Aileen Joyce BA90
Bohon, Travis Stewart BS96
Bond, Timothy K. BA86
Bone, Brian MS63
Bonham, Kelli Jean BA88
Booth Duane Paul BA75
Booth, Gordon Dixon BS63
Boren, Deborah BA92
Borg, Janett MA96
Boring, Brian BS06
Borom, Melanie Marie BA00
Boss, Michelle Annette BS91
Bowen, Jonathan Morris BA98
Bower, J. Kevin BA97
Bowes, Jeffrey Ray BS93
Bowman, Charlie Lee Delhotal BA83
Bowen, Stasha Ann BS10
Boyce, Brock Allen Tanner BS11
Boyce, Dianne BS67
Boyce, Ryan Dayley BS12
Boyd, Ward Carson BS68
Brower, Charles Edgar BS68
Bradley, Alexander Scott BS94, MS96
Bradshaw, Nancy Ann BA88
Bradshaw, Robert William BS04
Brady, LaDawn BS03
Brady, Michelle Lynette Peterson BA93
Brammer, Rebecca Lynne BA00
Brazee, Sarah Jean BS08
Bregante, Nicolas BS06
Brewer, David Grady BS83
Brewer, David Shane BS93, MS95
Brewster, Paul BS96
Bria, Frank H. BS94
Briggs, Gabrielle H BS11
Briggs, Jacqueline S. BA85
Briggs, Stacie S BA94, BA98
Brim, Greg Martin BS82
Brim, Greg Martin BS96
Brimhall, Darin Baur BS94
Bringhurst, Shane Thadeous BS89
Brinkerhoff, Colin J. BS93, MS98
Brinkerhoff, Delroy A. BS84
Brinkerhoff, Mary Suzanne BS68
Brinton, Julie BS02
Broadbent, Charles Winkel BS77
Broadbent, Dale Jay BS63
Brobio, Ramon Jose Abad BS93
Brockbank, Lynne BS92
Brogan, Rebecca Sue BS12
Brothers, Angela BA00
Brothers, William H. BS76
Brown, Alan Edwards BS83
Brown, Alicia Gorringe BA97
Brown, Amy E. BS05
Brown, Christopher Kirk BS08
Brown, Clayton D. BA00
Brown, Daniel Sundquist BS11
Brown, David Ellis MS92
Brown, Franklin Willis BA55
Brown, Hugh Michael BS98
Brown, Jeffrey BS96
Brown, Johanna Ertl BA93
Brown, Karen Kathleen BS02
Brown, Kimberly Elcock BS93
Brown, Kyle Ray BS09
Brown, Leah K BS04
Brown, Nyssa Roderick BS09
Brown, Robert Duane BA90
Brown, Sarah M. MS99, PhD04
Brown, Shawn Daniel BS92
Brown, Shashauna BA97
Brint, Shirleen BA97
Bruton, Cynthia Ann Jones BA82
Bryant, Rebecca J. MA77
Buchanan, Richard M. BS55
Buckner, Timothy Dean BA91
Buenehele, Dale Charles BS84
Buffington, John Charles BS85
Buhanan, David Bryant BS01
Bullock, Emma Kathleen Price BS91
Bullock, L. Wood BS79
Bullock, Margaret J. BA96
Bunting, Jessie R BS98, MS00
Burchfield, Michael Charles BS81
Burgess, Melanie BA00
Burgi, Beau Anderson BS95
Burk, Eraln BS62
Burkholder, Bonnie Marie BA95
Burnett, Charles Brewster BS79
Burr, Waldon Rollin BS93
Burrows, Brett Barlow BS93
Burrup, Sharon L BS10
Burton, Christina Marie BS10, MS12
Burton, Khristine Shaffer BA98
Burton, Lou LaGrange III BS88
Burton, Media Ann Thomas BA88
Burton, Patti BS71
Burton, Robert Corry BS56
Burton, Stephan D BS10, MS12
Busath, Peter Matthew BS10
Busenbark, Donald Duane BA89
Bush, JunolaSmith BA72
Bushman, Bonnie Kay BA78
Busselberg, Kristin Karin BA99
Butler, Mark Cheiron BS95
Butler, Steven Kay BS01, MS03
Butterfield, Christian Brent BS89
Butterfield, James F. BA72
Buttle, Joseph Worsley BS69
Buxton, Launa Fowles BA95
Bybee, Sarah Elizabeth BA99
Byers, Kenneth W. BA59
Byers, Reynold Elias BS92, MS94
Bylund, Michelle K. BS00
Byron, Edward E. BS76

CCC
Cahill, Earl Jeremiah BS96
Cahill, Earl MS99
Cahoon, Kenneth Vernon BA92
Calaway, James D. BS67
Caldwell, Mark Allen BS10
Call, Duane Bowen BS67
Call, Anson Vee BS66
Call, Christina A. BS04
Call, Eugene S. BS69
Call, Steven Max BS83
Callister, James Robert BS78
Callister, Karalynne Joyce BA97
Camosi, Jason T BS11
Campbell, Branton J. BA93, BS93
Campbell, Scot Elliot BS95
Canales, Lauri Palmer BA94
Candland, Lauren Marie BS03
Canfield, Bradley Dee BS90
Canfield, Ronald Virgil MS61
Cann, Weston BS96
Cannon, Beverly Ann Malstrom MA97
Cannon, Candis Albers BA77, BS77
Cannon, Christine BA97
Cannon, Edward Ronald BS05
Cannon, Laura BS06
Cannon, Layne Wareing BS75
Cannon, Michael James BS93
Cannon, Ruth Lynne BS65
Cannon, Susan BS69
Chivers, Laurie Alice BS69
Cano, Ramón Basil BA94
Canty, Kyle Mark BA87
Cardon, Boyd Louis BS67, MS70
Cardon, David Alan BS90
Cardon, Lori Lynn BA94
Cardon, Paul Marshall II BS94
Cardon, Royal Lavor BS69
Cardwell, Bruce W. BS86, MS92
Carey, Ernest L. MS69
Carey, Michael Aaron BS01
Carey, Paul Edwin BS87
Carl, Kyleen Joyce BA85
Carleton, Lee Newton BA92
Carley, Tiffany Gardner BA93
Carlile, Kerri Lee Huebner MS07
Carling, Donna Lee Larsen BA84
Carlson, David Lawrence BS89, MS91
Carlson, Russel Otto BS95
Carlsruh, Deborah B. BS71
Carlston, Laura Jean BS06
Conger, Shalise Colette Akemi BS11
Cook, Amber BS03
Cook, Daniel Matthias BA83
Cook, David Alan BS81
Cook, Jamie Lynn BA01
Cook, Kara Lyne MS98
Cook, Katrina Lynn BS07
Cook, Meggan Marie BA01
Cook, Sharla BA97
Cook, Suzanne Stirling BA89
Cook, William A BS57
Coombs, Kristine Marie Parkin BS90
Coombs, Richard J. Jr. BA66
Cooper, Craig Allen BS84
Cooper, Janet Marie Johnson BS74
Cooper, Ryan Lewis BS05
Cooper, Thayne Carl BS69
Corbett, Sarah Anne BA91
Corey, David L. BA74
Corey, Douglass Lyman BA99, MA01
Cornwell, Christopher Robert BS04, MS06
Corson, Samuel Mark BS08, MS10
Cortez, Arnold, Jr. BS77
Cotrell, Jenny L. BS77
Cotterell, Susannah Romney BA00
Cottrell, Sherry-Anne BA95
Courtney, Rebecca Suzan BA77
Cox, Ann BA75
Cox, Barbara Walsh BS73
Cox, Beverly Ann BS78
Cox, Cindy Lee BA99
Cox, Eileen BA98
Cox, Michael Robert BA93
Cox, Paul Franklin BS88
Coy, Jean Afton BS65
Cranahan, Haley Cherise BA99
Craig, Alan Scott BS71
Crandall, Alisa Page BA90
Crandall, Rachel Ann BA90
Crandall, Vern J. BA63
Crane, John Robert Jackson BS71
Crawford, Christopher Blair BS95
Crawford, Linda Lee BS69
Crawford, Lori Ann BS86
Crawford, Myron Lloyd BS60
Crays, Laura K. BA79
Criddle, Anne Blair BS87
Crisp, Elizabeth Erin BA97
Crichtfield, Larry Glen BA79
Crockett, Carlyn Michelle BA95
Crockett, Robert N. BS66
Ford, Robert Calvin BS66
Croft, Andrea Marja BA00
Croft, Bib-Shya Hwang BA89
Croft, Micah BS06
Cromar, Bruce Young BS67
Cromar, Scott BS89
Croshaw, Lori Lynn McLeod BA85
Crosland, Anne Crawley BA86, MA00
Crossman, Ronald J. BS77
Crowley, Jared Orson BS63
Crowther, Brad D. BA00
Crowther, Steven B. BA75, MA79
Crutcher, Warren Layne BS11
Cullings, Casey William BS96
Cummings, Laura Sue BA99
Cummings, Thor Benjamin BS95
Curtis, Kalani BA96
Curtis, Patrick Kimball BS04
Cuthbertson, Teresa H. BA77

DDD

da Rosa, Lisa Anne BA90
Dabo, Mitchell John III BS02
Dain, Lisa Anne BA87
Dalley, Betsy Ann BA87
Dalley, Ronald MA96
Dalmas, Rebecca Gaye BS01
Dalton, Dennis Winfield MA97
Dang, Vinh Xuan BS08, MS11
Daniels, James W. BS70
Daniels, Scott David BS05
Danner, Donald K. BS77
Darling, Kalene Jones BA97
Daryace, Simin Mohammad-Pour BS86
Daugherty, Ronald Jackson BA72
Davenport, Matthew Jared BA98
Davidson, Scott Levi BS12
Davies, Bruce H BA85
Davies, Diane BA87
Davies, Ric Courtney BA66
Davis, Brett John BS94
Davis, Bruce Michael BS74
Davis, Emily BS12
Davis, Eric Scott BS08
Davis, Eric Taylor BS80
Davis, Heather Marie BA01
Davis, James Robert BS86
Davis, LeAnne BA90
Davis, Lorin Richard BA58
Davis, Merrilee Moesser BA92
Davis, Sandra BS71
Davis, Trina Kristine BA89
Day, Clark Harris BS57
Day, J. Rodney MA91
Day, Lavelle BS61
Day, Lee Newel BS71
Day, Lora Lee BA87
Daybell, Marty Steven MS87
de Gaston, Catherine Elizabeth BS95
de Gaston, Sharleen Adrienne BS04
Dean, Erin Elizabeth BS00
Dean, Lisa Anne Dain BA89
Dean, Matthew Lee Youle BS91
Dean, Paul Raymond BA77
Dean, Samuel Paul BS91
Dearinger, William Carlton II BS65
DeCelle, Matthew Kirk BS12
Decker, Carla Ann Hinkle BS77
Decker, Renae Christine BA79
Decker, Ross Charles MA94
Dedrickson, Katherine Ann BS08
Dee, Kristen Payne BA87
Deete, Donna J. BS67
DeLange, Clark Denison BS70
DeLong, Richard Peter, Jr. BS72
Demos, Genevieve BA98
Deng, Xinyu MS94
Denison, Jonelle Marie BA92
Dennis, Morgan Andrew BS09
Denton, Jeanine S. BA77
deRenzy, Edward A. BS79
DeShazer, Michael Lamond BA78
Despain, Sharmar BS96
DeWaal, Nicholas BS04, MS07
Dewitt, Meghan BS06
Dickerson, Heather Renée BS03
Dickey, Lester MS68
Dickson, Allen Joel BS03, MS05
Dils, James Paul BS10
Dimond, Diana BS06
Dixon, Emily BA98
Do, Minh Nhat Vo BS09, MS11
Dohnr, Rodger Matthew BA95
Dolbin, Timothy Allen BA92, MA98
Domy, Jared Brouq MS95
Dorff, Michael John BA86
Dorff, Rebecca BS10
Dorius, David 0. BS63
Dorny, Jared Brouq BS93
Dorrance, Adelle W. BA72
Doty, Georganne Elaine BS73, MS76
Doubleday, Nathan F. BS94
Doud, Darrin Matthew BS92
Dougal, Casey Mark BS07
Dove, Katherine Rebecca BA94
Dowdle, Julie Kay BS90
Doyle, Angela Kaye BA93
Doyle, Truman Scott BS68
Drake, Danny Lee BS75
Drake, David Ladd BS83
Drake, Leston D. BA91
Draney, David S II BA91
Draper, Annaleea BA00
Draper, Arthur Zemira BA64
Draper, Otto L. BS60
Draper, Thomas G. BS95, MS97
Duffield, Kimberly Ladd BA95, BA98
Duffin, Kirk L. BS90
Duffin, Patricia Call BA91
Duke, Jared Daniel BS08
Duke, Steven Wayne BS74
Duncan, Angela Marie BS00
Duncan, Douglas John BA84
Duncan, Janet Alldredge BA92
Dunford, Melissa BA95
Dunn, Mary Colleen BA96, MA98
DuPree, Billy Glenn BS76
Durham, Jennifer BS93
Durrant, Eugene Jay BS55
Durrant, Gardner BA96
Durrant, Jacob Devin BS05
Durrant, Kristen Hatch BA91
Durrant, Vari Nelson BA99
Durtschi, Rebecca BS06
Dustan, Allyn W. BS85
Dustin, Marie H. BA93
Duvall, Suzanne Camille BS10

EEE
Eardley, Sunee Haws BA97
Earnshaw, Berton Allen BS01, MS03
Easton, Mckay Whetton BS10
Easton, Todd William BS93
Eatough, Judith Pursley BS64
Eaves, Laura Elizabeth BS81
Eckery, Michelle Ann Schuellke BA90
Edgar, Grover Carl BA72
Edman, Blaine George BA93
Edwards, Gary C. BS63
Edwards, John Mason II BS82
Edwards, Lacey Lei BA92
Edwards, Lyman Douglas BS88
Edwards, Matthew Price BS11
Edwards, Michael B. BS71
Edwards, William Lee BS75
Ehat, Andrew F. BS73
Eldredge, H. Bradley MS82
Eldredge, Kathy Rowley BS99
Eliaison, Eric R. BS02, MS06
Eliaison, Paul Joseph BS10
Elizabeth, Heide H. BA77
Ellett, Michael Jones BA86
Ellis, Amanda MS05
Ellis, Braden Dean BS10
Ellis, Leejean BA99
Elton, Celeste Dawn MS04
Emery, Lori Ann BA95
Emms, Julia Ann Titsworth BA92
Ence, Marshall Delbert BS97
Endrizzi, Deborah C. BA71
Enloe, Sharlene Wagstaff BA97
Ensigh, Tracy BS79
Eppich, Kevin Lynn BA78, MA96
Erath, Brenda Lynn BA94
Erickson, Barry MA96
Erickson, Jonathan James BS90
Erickson, Lisa Joy BA01
Erickson, Ronald W. BA77
Erickson, Roy William BS83
Eschenberg, Michael Jay BA94
Esselman, Michael BS06
Etcher, Dena Kesler BA91
Evans, Daniel Boone BS67
Evans, Leslie Jean BA93
Evans, Morgan J. BS59
Evans, Summer Thurston MS97
Evans, William Ray MS07
Evenson, Andrew T. BS96
Evenson, Mark W. BS80, MS83
Everitt, Renae D. BA79
Evers, Stacey Lynn BA98

FFF
Facer, Sharee BA96
Fails, Karl Richard BS99
Fairbanks, Peter Nathan BS77
Fajardo, Ruth Lloyd BA98
Fakrell, Larry J. BS75
Farley, Heather Renee BS07
Farkakis, Demetrios K. BS61
Farmer, Lance Earl BS93
Farnsworth, Grant Verdell BS04
Farnsworth, Robert Douglas BA94, MA98
Farr, Golden R. BA53
Farr, Karen BA85
Fawson, Philip Clifford BA80
Fearnley, David Lawrence BS94, MS96
Fearnley, Laurel Tamara BS87, MS88
Felsted, Sterling Arthur BS09
Fenn, Daniel Benson BS11
Ferguson, H. Rolfe MS66
Ferguson, Julie BS92
Ferguson, Margaret Lindsay BA76
Ferguson, Samuel L. P. BS91
Fenclius, Joel Brent BS94
Ferreira, Monica Howard BA00
Ferrin, Eric Gordon BA99
Fetbrandt, Joshua Taylor BS12
Fielding, Brandi Ann BA97
Fielding, Garth F. BS70, MA76
Fielding, Hallie Marie Woods BA99
Fielding, Joseph Ray BS62
Finch, Douglas Paul BA97
Finch, Jeanine BS82
Findlay, Lisa Calleen BA93
Findlay, Richard Bruce BS69, MS70
Finkenhagen, Mariann Rozelen BS01
Finlinson, Ruth BA01
Fishburn, J. Scot BS68
Fisher, Ellen Roundy MS69
Fisher, Heather BA99
Fisher, Jesse Frank BA92
Fisher, Laura Michelle BS94
Fisher, Rachel J. BA91
Fisher, Todd Lowell BS98, MS99
Fitzpatrick, Diane Lee BS91
Flambe, Ronald Roger BS68
Harrell, Mason Douglas, Jr. BS68
Flanders, Pamela T. BA75

Fletcher, Donald Eugene BS58
Fletcher, Jeffrey L. BS89
Fletcher, S. Adam BS12
Fletcher, Scott Robert BS86
Florence, Heather Aurora BS04
Flower, Linda Lee Hurmence BA84
Floyd, Jennifer Kathleen BS91
Flygare, Steven D. BS09
Fonda, David Bartlett BS87
Fong, Sharilyn Piilani BA88
Forbush, Suzanne Kitchen BS04
Ford, Orlin E. BS49
Ford, Ronald R. BS76
Ford, Wendy Grow BS93
Fordham, Stuart Blake BS87, PhD95
Forgrave, Andrew Cornell BS99
Forkner, Jefferson Gaines BS10
Forsberg, R. Andrew BA82
Forsgren, Jessica Jane Rex BA97
Forsnes, Elaine Ann BA65
Foster, Leslie Jane BS01
Francis, Amanmda Ellis PhD12
Francis, Leon Keith BS85
Francis, Leslee Gae MA83
Franckowiak, Robert Thomas BA95
Francom, Christine Ann Mathews BA74
Frandsen, Marvin Vaun BS82
Freden, Eric M. PhD94
Fredette, Susan R. Irvin MA95
Fredrickson, Jon Richard BS04
Free, Melanie BA97
Freeman, Arthur Alan BA97
Freeman, Dennis K. BS79
Freestone, Lisel BA99
Frodsham, R. Tim BS78, MS80
Frost, Judylyn Fausett BS76
Frost, Kenneth B. MA78
Fuchs, Frank Jaromir BS93
Fults, Jared Cole BS84
Furner, Mary Ellen BS87
Furuto, Linda Hui Lin BA00

GGG
Gabrielsen, Randee Kay BA74
GaGon, Ian Scott BA97
Gallbraith, Bruce H. BA66
Gale, Rebecca BA86
Gandolph, Tamara Kay BA99
Ganowsky, Jennifer Kim Rosskopf BA91
Gardiner, Judith Diane BS76
Gardiner, Kevin Robert BS91
Gardner, Andrea Nicole BA97
Gardner, Dwayne Leron BS93
Gardner, Michael Emmett BS71
Gardner, Trenna BA00
Gardner, Willard Hale MS56
Garff, Lee Wardle BA01
Garff, Melinda Taylor BA88
Garfield, Stephen Aikens BS79
Garner, Bradley Evan BS88
Garner, Carrie Jaussi BS90
Garner, Lynn E. BS62
Garrick, Janet Ruth BS67
Gartsidie, James Nicholas Burgess MS89
Gates, Dorothy L. BS65
Gates, Nancy R. BA87
Gatrell, Clorinda Agatha BA94
Geertsen, Marcia Anne BS95
Geiger, Denise Morey BA75
George, Lisa Ann BA97
Gerber, Conrad Lanny BS90
German, Tamra A BA01
Germane, Kimball Richard BS10
Gessel, Gary Frederick BS77
Gho, Carol B. BS69
Gibbons, Carl Robert BS94
Gibby, Marlow David BS54
Gilchrist, Alan Curtis BS61
Gilchrist, David BA96
Giles, Lois G. BA77
Giles, Wendi Sue BA00
Gill, David Luke BS87
Gill, Gurcharan Singh BS58
Gill, M. Jean MA78
Gillett, John Nathan BA94
Gilmore, Dallas L. BS08
Gilson, Kirsten Corrine BS97, MA99
Gingrich, Harold Scott BS84
Ginos, Brenda Faith BS08
Gittins, Gary Haslam BS66
Gittins, Larry Lane BA81
Gleason, Sherilyn Larson BA84
Glenn, Val D. BS69
Glines, Jennifer Olcott MS89
Goates, A. Wayne BA73
Gobel, Karen BS71
Goddard, Linda MA96
Goering, Don D. BS76
Goeringer, Krista Lynn BA00
Gold, Sandra BA92
Golding, Karl Marlin BA80
Gonzales, Aminda Frances BA96, MA98
Goodman, Charles Michael BS07
Goodman, Eric Llewellyn BS03
Goodman, Shelley BA91
Goodrich, Roger E. BS64
Goodsell, Troy Larry MS93, PhD97
Goodson, Raymond T. BS86
Goodwin, Diane A. BS56
Goodwin, Kelly Shane BA86
Goold, Jeanine Patricia BA92
Gorbutt, Brent Benson BS04
Gordon, Lara Stout BS00
Gordon, Lela Marler BS69
Goss, Sandra Lynn BA98
Gowans, Beth Ann MA93
Graff, Tona BA94
Grand, Christopher Prince BS86
Grange, John Robert BS76, MS78
Grant, Christopher P. MS88
Gray, David J. BA77
Gray, Michael Ian BS70
Gray, Sheri Diane BA88
Grayson, William Patrick BA87
Green, Nathan Eric BS11
Green, Randy Mackey BA93
Greene, Renee Roy BA87
Greenhalph, Neil W. BS63
Gregory, Jena Marie BA96
Gregory, Lois Margaurite BA77
Grenawalt, John A. BS86
Gribble, Gerald D. BA71
Gribovski, Thomas MS94
Griffey, Jill April Davis BA85
Griffin, Michael John BS11
Griffin, Rhonda Lynn Leilani BA94
Grigg, Nathan B. BS07
Grilliot, Charles R. BS89
Grisenti, Teena Lyn BA89
Grizzle, Linda Sue BS03, MS05
Groenig, Robert N. BA75
Groesbeck, Alan Dickson BS77
Groesbeck, Todd Dickson BS85
Groharing, Cheryl Peterson BA92
Groll, Jeanette Davis BS92
Gronski, Kristi Marie BA97
Grout, Jason MS03, PhD07
Grundvig, Julienne Scott BS93
Gruver, John David BS08, MS11
Gubler, Emily Ann BS04
Guerin, William Edward BA00
Guinn, Judy Kaye BA89
Gulbransen, David J. BS85
Gurr, Sally BS05
Guymon, Vernon Melvin Jr. BA65, MS67
Guzman, Christopher Abraham BS11

HHH
Habedank, Allan Lee BA86
Haddock, Michael Gary BS85
Hadfield, Kimberleigh MA96
Hadlock, Andrea Jeffs BA99
Hagerty, Kathleen Bess BA01
Haggerty, John F., Jr. BS66
Haight, LeVoy Golden BS87
Halcomb, Kerri BA90
Hale, D. Brent BA75, MA75
Hale, Lara Cheryl Freebairn BA95
Hales, Karl D. MA91
Hall, Andreas F. BS63
Hall, Blaine Dean BS67, MS69
Hall, H. Tracy MS98
Hall, Huntington Tracy BS96
Hall, Rebecca Dibb BA97
Hall, Shane Nikolaus BS97
Hall, Spencer E BS98, MS00
Hall, Stephen James BA98
Halverson, Denise Marie BS89, MS94
Ham, Peggy Ann Hawkins BA72
Hamilton, Blake Douglas BS86
Hamilton, Carolyn Ruth Cook BS88
Hamilton, Jerry A. BS86
Hamilton, Michael Raymond BS92
Hammond, Heather Marie BA97
Hammond, Nathaniel Alan BS99
Hampton, Thomas Joe BS86
Hancock-Fisher, Christine BS90
Hancock, Donald C BS84
Hancock, Lucinda Chiu BS05
Hancoxk, Lynn R. BS75
Hanks, Danielle BS12
Hanks, Grant Allen BA98
Hanks, John Dennis, Jr. BA00
Hanna, Cynthia Patricia BA84
Hannan, Jessica Ann BA01
Hansen, Beth Ann BA89
Hansen, Brian Francis BS02, MS05, PhD10
Hansen, Brian Keith BS80
Hansen, Brittany C. BS06
Hansen, Clifford W BS88
Hansen, Don R. BS71
Hansen, Donald Gene MA91
Hansen, Doris Louise BA98
Hansen, Gary W. MS68
Hansen, Gregory Kent BS97
Hansen, James V. BS78
Hansen, Kathi Margaret Sampson BA97
Hansen, Kerry Steven BA79
Hansen, Linda Marie BA87
Hansen, Merlin Arvel BS70
Hansen, Micole Rogers BS00
Hansen, Ray Richard BS58
Hansen, Russell E. BS70
Hansen, Thomas L. BA95
Hansen, Tiffany Dee BA96
Hansen, Timothy A. BS02
Hanson, June Howard BS57
Hanson, Loraine Jones BA88
Hapeman, David Earl BS84
Harding, Keith Donald BS80
Hardy, Bryan James BS12
Harker, Bryan Edward BS93
Harker, Michelle Hannah BA01
Harman, Kristin Kay BA98
Harmer, Craig Terry BS87
Harmon, George E. BS61
Harmon, Jonathan P. BS07
Harmon, Ryan BS06
Harner, Carol Louise BS92
Haroldsen, Ancel Jason BS91
Haroldson, Joseph Carter BA00
Haroldsom, Jason MS98
Harris, Frank Danvelle BA57
Harris, Janice BS88
Harris, Lloinda Mae BS56
Harris, Megan Elyse BS11
Harris, Pamela Weber BA91
Harris, Roger Wright BS67
Harris, William Andrew BA99
Harrison, Dennis Eugene BS64, MS68
Harrison, Evan Dean BS67
Harrison, Gary William BS70
Harrison, Kurt Lawrence BS88
Hart, Deborah Scheib BA90
Hart, Lewis W. BA69, BS69
Hart, Rebecca Bennion BS97
Hartvigsen, Ellen Louise BA72
Harward, Leland Kay BS69
Harward, Matthew Collier BS01
Harward, Terry BA86
Hashemi, Zahra BS89
Haskell, Sterling Dwane BA96
Hatch, Brook Bowcutt BA96
Hatch, D. Diane BA60
Hatch, David Nelson BA79, MA81
Hatch, Jeana Sue Chilton BA99
Hatch, Lynette BS93
Hatch, Tiffany Allen BA96
Hatch, Tiffany Allen BA97
Hatch, Tine Rene BS84
Hauber, Bonnie Jean Packer BA96
Hauber, Mary Jane BS70
Haven, Stuart L. BS95
Havens, Dennis L BS97
Hawkes, Michel Blaine BA78
Hawkins, Bruce BS78
Hawkins, Elizabeth Marie BS07
Hawkins, Rachael Kay BA00
Hawks, Vern Revere, Jr. BS75
Haycock, Michelle BA82
Haymore, Veronica Frances BA99
Hays, Jeffrey Brian BS81
Hazzard, Amy D. BS85
He, Yuren MS09
Healy, Sean Patrick BA01
Heap, David Norman BS74
Heasley, McKay Nathan BS09, MS11
Heaton, Hal B. BS75
Heaton, Timothy L. BS86
Hedding, Terrance C., II BS89
Hedelius, Merilyn MA96
Hedges, Ariana Marie BS11
Hedrick, Paul David BS00
Heid, Ashley Ann Sheffield BS05
Heil, Laurel Bastion BS92
Heim, Cristina Daneille Montanino BS03
Heintz, James Raymond BA93
Hellewell, Lorraine BS97, MS99
Hemenway, Gregory Mark BA95
Hemingway, Vern Rulon BS71
Henderson, Luke Butler BS08
Henderson, Randall D. BS01
Henderson, Shannon Smith BA97
Hendricks, Jeffrey James BS11
Hendricks, Karla Jeanese BS08
Hendricks, Mark E. BS07
Hendrickson, Scott Jay BA79, MA84
Henroid, Rosalee D. BS71
Henry, Alison BA97
Herlin, Kenneth Wayne BA85
Hernandez, Erika BS06
Herdon, Mary Robin BA89
Herring, Eli BA96
Hettinger, Christopher James BS12
Heward, Lynn Paul BS70
Heywood, James Kay BS68
Heywood, Joseph Leonard BS70
Hickman, Steven Robert BS76
Hicks, George William BS71
Hicks, Jennifer BA84
Hicks, Teresa Kay BA77
Higgins, John C. BA58, MS60
Higinbotham, Dan W. BS78
Higley, Michael Leon BS98, MS00
Hill, Aaron Thomas BS05
Hill, Diane Skillicom BA83
Hill, Heather Anne BA93
Hill, Lelon Ronald BS68
Hill, Lynda McSeveney BA97
Hill, Richard Wayne BA53
Hill, Simon Lee BS01
Hillon, Wilford Bruce BS57
Hills, Marisa Lynn BA96
Hillstead, Julie BA97
Hilt, Collette Davis BS94
Hilton, Ronald Nathan BS78
Hinckley, Clark B. BS71
Hinton, Lynn Bernard BS69, MS72
Hintze, Eric Pool BS97
Hintze, Sharon BS66, MS68
Hirsbrunner, W. Wayne BA73
Hoagland, Gordon Wood BS66, MS68
Hodge, Tamara Lee BS95
Hodgson, Brett Duane BS86
Hoelzer, Susan Elizabeth Parkin MS96
Hoge, Jill Marie BA99
Hoggan, Merianne BA82
Hogge, Aaron Richard BA96
Holdaway, Allison BA01
Holding, Tina Renee BS90
Holgate, Andrea BS06
Holland, Paul Kyger BS86
Holliman, Katrina BA96
Hollingshead, Ralph E. BS71
Hollist, Linda Sue BA91
Holman, Barbara Ann BS73
Holmes, Frances R. MA76
Holt, Amy Burton BA95
Holt, Jennifer Rebecca BS03
Holtkamp, Rachel BA01
Hooper, Jennifer Jean Pedersen BA86
Hoopes, Heidi BA84
Hope, Arthur Carl BS59
Hoppe, Page Ann Palmer BS97
Hopper, Joseph Anderson BS04
Horsley, Teri Wineeter BA85
Hoschouer, Leah E. BA92
Hoskins, Analisa Bell BA91
Hoth, Jeremy Christian BA98
Householder, Leslie Kaye BA95
Housley, Laura Leigh BS93
Housley, Matthew MS06
Housley, Sean Mervin BS93
Howard, Daniel Michael BS97
Howard, Daris William BS86
Howard, Grant C. BS49
Howard, Laurel Brigitte Robison BS71, MS73
Howe, Brent BS09
Howe, David Kent BS68
Howe, Michelle BA75
Howell, Anthony Wade BS86
Howell, Barry Lee BS85
Howell, Laura Lyn BA89
Howes, James Burr BS80
Howes, Russell Edward BS08
Hoyt, Leon Frederick BA75
Huang, Ray BS91
Huber, Carole BS66
Huber, Leslie BA98
Hudson, Michael Ray BS82
Huebner, Kerri Lee BS05
Huff, Benjamin Isaac BS96
Huff, Benjamin Isaac BS96
Huff, David James MS94
Huff, Holli BA00
Huff, Kari Tuomisto BA84
Huff, Melanie Taylor BS88
Huffaker, Jennifer Janet BA94
Hugh, Brent DeRay BS85
Hugh, Brent DeRay MS89
Hugh, Patsy Yau BS82
Hughes, Brent W. BS74
Hughes, Cindy Michelle BA99
Hughes, John A. BS71
Hughes, Vaughn Howard BS97
Hulet, Dennis J. BS76
Hulet, Gary Ray BS79
Hull, Jordan T. BS10
Hulse, Amy Renee BA01
Humble, Angela BA95
Hummer, Steven Frank BS71
Humpherys, Jan L. BS92
Humpherys, Jeremy Keith BS99
Hunsaker, Nathan Lloyd BS82
Hunt, Elizabeth Marie BA99
Hunt, Russell Lee BA73
Hunter, Andrew Michael BS05
Hunter, David Larry BS93
Hunter, Iain BA96
Hunter, John Brian BS96
Hunter, Marlow Christensen BS71
Hunter, Michael Sheldon BS98
Hutcheson, Donald H. MS67
Hutchings, Craig David BS95
Hutchings, Craig David BS95
Hutchings, Elizabeth MS02
Hutchings, Jeffrey B. BS07
Hutchinson, Sheri Ann BA86
Huxford, Kari Kaye BA01
Hwang, Daniel K. BS03
Hwang, Jong S. MA89
Hyatt, Martin Henry BS86
Hyatt, William Joseph BS92, MS94

Ibbertson, Bryant V. BS92
Ingermanson, Jennilyn BS96
Ingles, Christine BA89
Inouye, Megan Thorpe BA01
Irwin, Susan Rosemary BS86
Irwin, Deborah Jane BA74
Israelen, Kenneth L. BS97
Iverson, Cyle Bryan BS85
Ivie, Waine Otto BS65
Izu, Alisa Emiko BS02

Ja’fari, Ali (Reza,Farhang) Fesharaki BS86
Jackson, Brent Leland MS70
Jackson, Errol Kent BS74
Jackson, Laura LaRee BA87
Jackson, Weldon Francis BS59
Jacobs, James O. BA95
Jacobs, Jeanette Allen BA94
Jacobs, Richard West BS64, MS66
James, Susan Naomi BA82
Jamiolkowski, Steven BA93
Janes, Norbert BA64
Janzen, Danielle Nicole BS12
Jarman, Arthur Lavell BA67
Jarvis, Norman C. BS94, MS96
Jarvis, Tyler J. BS89, MS90
Jasperson, Boyd Ralph BS68
Jeans, Michelle Elaine BS84
Jeffries, Randall Edward BA97
Jeffery, Janalee Rachel BA00
Jelly, Katherine Louise BA76
Jenkins, Ana Lisa DeLong BA93
Jenkins, Donald LeRoy, Jr. BS81
Jenkins, Ellen BA80
Jenkins, Paul Michael BS00, MS02
Jenkins, Rachel Wood MS02
Jennings, Johnny K. BS84
Jensen, Ashley Kennard BA99
Jensen, Carol Gammon BS92
Jensen, Carter Garrison BA96
Jensen, Daniel Miller BS11
Jensen, Daniel S. BS07
Jensen, Delos Clark, Jr. BS77, MS82
Jensen, John David BA95
Jensen, Julean BA95
Jensen, Lisa Ann BS88
Jensen, Mi Soon Hong BS90
Jensen, Robyn L. Savage BS83
Jensen, Ryan James BS11
Jensen, Toni Kristine BS85
Jenson, Maria Luz BS02
Jeppesen, David Noyes BS02
Jiménez, Jolynne Knight BA94
Johanson, Paul Thomas BS93, MS95
Johnson, Allison Payne BA93
Johnson, Barbara Ellen BS65
Johnson, Bryant W. BA82
Johnson, Cara Louise BA88
Johnson, Carl Mauritz BS63
Johnson, Casey Patrick BS03, MS05
Johnson, Catherine A. BS97
Johnson, Cynthia Jeanne Bailey BA76
Johnson, Darrell Gordon MS94
Johnson, Don Scott BS83
Johnson, Hagan D. BA76
Johnson, J. Drew MS11
Johnson, Jan Rovetti BA82
Johnson, Janet Marie BS74
Johnson, Jared Drew BS09
Johnson, Joanna Jean BA95
Johnson, Jordan Kimball BS10
Johnson, Karil Suzanne BA83, MA91
Johnson, Kathleen Denise BA93
Johnson, Kristen Lyn BA97
Johnson, Laura Jean Jeffery BA94
Johnson, Michelle Peterson BS03
Johnson, Phil MA96
Johnson, Phillip D. BA85
Johnson, R. Kent BS65
Johnson, Randall E. BS80
Johnson, Ryan Wayne BS05
Johnson, Sarah Christine BS09
Johnson, Scott Tyler BA88
Johnson, William Carl BS61
Johnston, Andrew Cowley BS11
Johnston, Katherine Elizabeth BA97
Johnston, Sheri Lynn BS84
Joines, Michelle June Brown BA99
Jones, Camille Rae BS02
Jones, Craig Leroy BA82
Jones, Cree BS06
Jones, Edith Mae BA87
Jones, Elizabeth Ann Merrill BA65
Jones, Elizabeth BS90, MS92
Jones, Gaylan Isaac BA74
Jones, Heather Elida BA00
Jones, Heber Warren BS66
Jones, Jaylan S. BS07
Jones, Jeff Allen BS96
Jones, Jill Clark BA95
Jones, Jill Valerie BS85
Jones, Kerri Annette BA98
Jones, Khayyam Alexei BS98
Jones, Michelle BA96
Jones, Michelle Lorraine BA99
Jones, Sterling B. BS92
Jones, Steven Robert BS03, MS05
Jones, Tracy Ann BA97
Jones, Troy MA96
Jones, Wesley Alonzo BS09
Jones, William Robert BA90
Joost, Jill BA96
Jorgensen, Tracy Anne BS01
Jorgenson, Phil M. BS56
Judd, Dorothy Peyton BS68
Judy, Kathleen BS84
Jung, Grace Jinhee BA01

KKK
K C, Sanjeep BS12
Kagel, Phillip Allen BS71
Kalt, Lori BS93
Kaluhikalani, Mana Choy MA91
Kammerman, Patricia Kempton BA97
Kanno, Roy Stephen MA91
Karbakhsh, Wendi MacLean BA87
Karren, Nathan Kent BS11
Kassner, Todd Norman BA92
Kawasaki, Tatsuya BS93, MS96
Kearl, Audrey BS06
Kehr, Robert Webster BS72
Kekumano, David L. BS66
Kelemen, Clark Hall BA86
Keliiliiki, John Parker BS61
Keliiliiki, Dale K. BS66, MS71
Kellar, Gregory Michael BS81, MS83
Keller, Elmo A. MS61
Keller, Joseph Aaron BS10
Kelley, Michelle BA82
Kellis, Susanne BA96
Kellnerova, Sandra BS06
Kemmerle, Melissa BS93
Kemp, Beth Joyce Ludlow BA82
Kemp, Karalynne BS96
Kempton, Mark Condie BS08, MS10
Kennard, Becky BA96
Kennedy, Chelsea Johnson BS11, MS12
Kennedy, Leon Joseph BA85
Kenneth Eugene Scott BS90
Kenney, John Doran BS88
Kent, Curtis BS06
Kent, Patricia BS73
Kerby, Brent Lloyd BS06, MS08
Kern, Vickie Tams BA01

Kerr, Brian J. BA94
Kersh, Douglas William BS83
Kesler, Margaret BA00
Kesner, Tawny Farmer BA01
Ketcheson, David Isaac BS04
Kevin F. Kingborn BS90
Kidder, Kathy BA94
Killian, Marie Coy BS11
Kim, Swan BA01
Kim, Vicki Herbst MS98
Kim, Victoria Herbst BA79
Kim, Ye Won BS65
Kim, Young Yong BS88
Kimball, Larry Robert BS64
Kimbell, Heidi Hileman BA77
King, Douglas R. BS79
King, Lance P. BS85
King, Ronald Kay BA87
King, Russell Brent BA88
King, Tammy BA97
Kinghorn, Kevin F. BS90
Kintz, Laura Jean BA79
Kirkby, Elizabeth Ann BA95, BS96
Kitchen, Karen Renee BS99
Kitchen, Michelle BS03
Kite, Christopher Warren BS78
Kleinman, Lynda Kay BA86
Kleinman, Melinda Sue BA88
Kleinman, Nathan Layne BS92
Klingler, Kenneth Duane BS78
Knight, Kimberly Ann BA92
Knight, LaTisha Joanne BA01
Knight, Ronald A. BS60, MS62
Knudsen, Randall Johnson BS70
Koehler, Leighton Francis BS85
Kohler, Joan T BA86
Koljanin, Evica BS94
Koller, Christopher Bain BS95
Komm, Steven Michael BS94
Kotter, Garold Keith BS70, MS70
Kowallis, Karl William BA98
Koyle, Mark Hansen BA74, BS74
Kreuger, Shanon Diane Davies BA89
Kristjanson, Dana Lynn BS90
Krohn, William L. BS09
Krumwiede, Tim Ryan BS11
Kueser, Ronald James BA85
Kuksov, Dmitri PhD98
Kullick, Edward Jacobs BA53
Kunz, Kandice Udy BA99
Kuttler, Kenneth L. BS74, MS76

LLL
Lai, Fung Lin (Annie) BS89
Lallis, Acel Dee BS68
Lalliss, Perry VerNon BS97
Lamb, Genette BA90
Lamb, Glenn Doyle BA75
Loveridge, Robert BS69
Low, Steven I BS87
Lower, Douglas Leland BS63
Lowry, Rodvern TeWhiti Love MA94
Luckau, Konda Jo BA97
Ludlow, Linda Louise BA87
Ludwinski, Rachelle Cottle MA93
Lunceford, David Lee BA77
Lund, Cynthia Jean BA87
Lund, John J BS89
Lund, Kevin J. BS87
Lund, Lawrence Gregory BS71
Lund, Lorin Michael BS85, MS87
Lund, Sandra Jean BS68
Lundell, J. Lindroth MA77
Lundgreen, Dennis F. MA76
Luo, Sarah M. MS11
Luo, Yi BS07, MS09, PhD12
Luth, Kimberley Ruth BA96
Lutz, Cameo BA96, BS96
Lutz, Steven Scott BS07, MS09
Lydkison, Aubrey Michelle BS12
Lyman, Rebecca Reynolds BA92
Lyman, Richard Gee BS60
Lynd, William Baxter BS78
Lynes, Bonnie Jean BA00
Lyon, Joyce Bushman BA85
Lyon, Mark Edward BA91
Lyon, Steven Kent BA88
Lyon, Vicki A. BS73
Lythgoe, Mikal Lee BA94
Lythgoe, Spencer Brent BS04
Lytle, Joshua Wayne BS08, MS11

MM
MacArthur, Clay S. BS00
MacDonald, Anne Marie BA95
MacDonald, Paul Stuart BS81
Machida, Ryoki BS89
Machula, Myron Eugene BA75
Macias, Carmela Herrera BA98
Mackay, Brandon Kent BS03
MacLeod, Lochlin A BS88
Madden, Michael J. BS69
Madsen, Danielle BA98
Madsen, Delia Rae BA88
Madsen, Joan Marie BS11
Madsen, Randy MA96
Magaoay, Juan BS60
Magidson, Jeremy Franklin BS98
Magland, Jeremy MS00
Magleby, Crustal Madsen BA00
Mahalko, Eugene D. BS74
Mahbod, Mahmoud BS61
Majeske, Kaylene BS95
Major, Robert Drew BS80
Makakoa, Noelle Koolalani BA94
Malani, Chelsea Rose BS10
Malloy, Nicole Andrea BS11
Malmrose, Lori Ann BS88
Malone, Carol Hawker BS71, MS72
Malstrom, Beverly Ann BS91
Mancuso, Scott Charles BS12
Mangelson, Max Lorenzo BS67
Mangum, Jennifer Lynn BA96
Manning, Theron H. BS63
Manwaring, Heather Gene BS01
Manwaring, Jed Waldon BA78
Manwaring, Nathan BS06
Mao, Yonghong MS97
March, Don Daniel BS05
Marcucci, Matia Luella BA96
Marker, Thomas Lee BA00
Markham, Stephen Jay BA90
Marquette, Diane Leigh BA76
Marshall, Jonathan Thomas BS98
Marshall, Katherine Empey BA97
Marshall, Nathan Douglas BS11
Marshall, Neldon Hayes BS58
Marshall, Rebecca Diane BA00
Marsing, Kari Lynn BA96
Martin, Shannon Cassidy BA92
Martinez, Carmen D. BA90
Marx, Crystal Davis BS99
Mason, Annette Gold BA99
Mason, Sterling Alma BS58, MS62
Mathews, Susan Marie BS82
Mathis, Donald Forrest BS67
Matthews, Michael Edward BA97
Matthews, Terri BA88
Maughan, Karna BS94
Maughan, Mitchell D. BA86
Maule, Carol Ann BS70
Maximo, Rui Young BS94, MS96
Maxwell, Kristen Renise BA92
May, Christine Marie BS97
May, Kristin Lucilla BA97
Mayer, Deborah Lynn BS89
Mayer, Neal L. BS79, MS81
McAffee, Don B. BA77, BS77
McAllister, Suzanne Layne BA90
McBee, Brian Keith BS92
McBride, Clarence Edward BS58
McBride, Linda Anne BA73
McBride, Sarah Margaret BS09
McCabe, Lisa Annette BA92
McClure, Benjamin Roy BA97
McClurkin, Ryan Michael BS10
McConnell, Curtis W. BS80
McCown, Michelle Diane BS90
McDaniel, Marlin Neal BS83
McDonald, Jan BS92
McDonald, Lydia D’Ann BA82
McDonald, Robert A. BS63
McDougal, Jay Edmund BS93, MS95
McEvers, Debra Joan BA85
Moulton, Angela Renee BA96
Mueller, Alison Harris BA97
Mueller, Kathleen Jeannette BA86
Mueller, Wilford MA95
Mufich, Carolyn Lee BA62
Muir, Annette Marie BA96
Mullins, Lewis MA96
Mullins, Matt MA96
Mullins, Megan McKinnon BS03
Mullins, Wendy BA84
Mulnix, James Russell BS98
Mumford, Andrea BA97
Mundell, Dan Beebe BS83
Munson, Tyler Scott BA96
Munyan, Jason Walter BS04
Munyan, Jelean Humpherys BS81
Muranaka, Lynette Mihoko BA94
Muranaka, Nobuo MS70
Murdock, David Evans BS76
Murdock, Hy Mari Peery BA00
Murdock, Scott Glen BS04
Murray, Norman B. MS72
Murray, Ryan William BS11
Murri, Sarah Marie BS03
Murugesan, Thilagavathi MS95
Musick, Beth Ann BA99
Myers, Danielle Doiron BS96
Myers, Jeanette Elaine BS84
Myers, Tamara Blake BA00

NNN
Nakayama, Kiyoko BS95
Nath, Sukhendu MS67
Nations, Danielle Dione BA00
Neeley, Angela Stratford BA97
Neider, Michael Antone BA73
Neilson, Stephanie BA89
Neish, Steven K BS86
Nelson, Alvin John, Jr. BS59
Nelson, Britte Anne BS08
Nelson, Curtis G BS10, MS12
Nelson, Fred M. MS82
Nelson, Janet Alma Richards BS68
Nelson, Jeffrey W. BS78
Nelson, Julianne D. BA98
Nelson, Kenneth Ralph BA72
Nelson, Laura Jean Secrist BA97
Nelson, Lauri Richelle BA89
Nelson, Reed A. BS84
Nelson, Travis Clare BA96
Nemirovskaya, Maria MS96
Nesbit, Rebvecca Ann BS99
Neubert, Lisa Gay BA91
Newby, Van Arthur BS86
Newman, Elizabeth Ann BS85, MS91
Newson, Ronald Ralph BS65
Newton, Gregory Clark BS78
Newton, Standley Oneil BA85
Nguyen, Long Pham Bao MS08, PhD12
Nicholls, Jeremy David BS11
Niemelä, Jocelyn BA87
Nielson, Kate Michaelis MS89
Nielson, Mark J. MS85
Nielson, Pace Peterson BS01
Nielson, Erica Nicole BS12
Nielson, Margaret H. BS68, MS85
Nielson, Mark Joel BS84
Nielson, Nadean MA96
Nielson, Richard G. BS69, MA71, MS71
Niles, Nathan Allen BA01
Nilsen, Lorrain Rowley BS82
Nilsson, Robert MA96
Niu, Harvey W. BS79
Niumeitolu, Litia M. MA82
Noakes, Mark J. BS01
Noble, Nephi Allan BA95, MA97, PhD02
Noker, Alvin John BS56
Nordfelt, Lars MA99
Norton, Lisa Kay BS91
Nunes de Almeida, Carla do Ceu BS08
Nuzman, Julianne September BS91

OOO
O’Farrell, Amy Christine BA95
O’Hara, L. Michele BS91
O’Berry, Shawn Mauritz BS97
O’Brien, Kathy Lyn BA81
O’Dwyer, Casey Patrick BS03
O’Neal, Laura Renee BA94
O’Neil, Connie Colleen BA76
Oakeson, David Wayne BA83
Oh, Kil J. MS70
Okeson, Effie Jo Anne BA89
Olcott, Douglas R. BS67
Olcott, Jennifer BS87
Oldham, Laura Davis BS95
Olds, Roger Alan BA76
Olds, Val Thomas BA84
Oleole, Dean Hekili BS98
Oliphant, Louis BA95
Oliphant, Travis Elgin BS95
Oliphant, William G. BS91
Olivier, Vernon L. MS70
Olsen, Darwin BS62
Olsen, Deborah B. BA75
Olsen, Richard Alan BS60
Olson, Harold C. MA77
Olson, Lars Erick BS00
Omran, Mohammed Othman N. MS92, PhD97
Ord, Richard Neil BS54
Orton, Kipp J BS94
Orton, Matthew W BS85
Osom, Regina A. BS77
Ostler, Brian Harold BA77, MA91
Ostler, Leslie BS12
Ostraff, Melinda Weston BS94
Otis, David Scott BA81
Otis, Kelly Beatrice BS09
Otto, Merilee W. BA77
Ouimette, David Scott BS86, MS87
Overhiser, Kurt Henry BS99
Owen, Patricia BS84
Owens, Jerry Lance BS64, MS66
Owens, Kayla Denise BS07, MS09

PPP
Pace, Jamela Van Wagoner BA95
Pace, Randy Reed BA74
Pace, Shwanna Moser BS83
Pacheco, Johathan Hawkins BS02
Pack, Elbert Chandler BA58
Pack, Leslie MS03
Pack, Miriam BA91, MA96
Padilla, Patrick P. BS07
Page, David M. BS12
Paget, Kathrine Heiner BS05
Palmer, Dana Ann BA97
Palmer, David Aaron BS02
Palmer, Eldon Von BA87
Palmer, Jennifer BA97
Palmer, Rebecca BS03
Palmer, Van R. BS71
Pan, Lu MS95
Pang, King Fai MS08
Papenfuss, Joseph K. BS61
Pardoe, David Merrill BS02
Pardoe, Perry F BS85
Pèrè, Philip E BS12
Park, James Darrell BS96
Parker, Diane BS89
Parkin, Marny Kai BA92
Parkin, Susan Elizabeth BS94
Parkinson, Kristy L. BS09
Parkinson, Marlene Eriksen BS93
Parr, Lori Loveridge BA90
Parry, Vinette BS66
Partridge, Lezlee Michelle BA96
Patton, Robert James BA82
Patten, David Yoshi BS03
Patterson, Christine BS95
Patterson, Janet Sevy BA86
Patterson, Virgil J. BS68, MS70
Patty, Spencer Robert BS09, MS11
Paul, Eric Robert BS66
Peterson, Thomas Flay BS66
Paul, Robert MS71
Paulsen, Dick R. MA66
Paulsen, Rebecca Ann BS94
Paxman, Steven Jacob BS02
Paxton, Victoria Lynn BS90
Payne, Carolyn Kay BA74
Payne, John Jacob BS02
Pearce, Kent BS72, MS75
Pearce, Kim Joel BA86
Pearson, Amelia Marie BA97
Pearson, Boyd Albert BS67
Pearson, Natalie Eta BA92
Peck, Jocelyn Ednabell BS11
Pedersen, Allen Dean BA53
Pedersen, Jean J. BS55
Peel, Julie Marie BA00
Pelland, Todd Edward BS90
Pelton, Leslie Gae Francis BS74
Pendlebury, David Arthur BS08
Peng, Wei Xiang (Kaelene) BS86
Penrod, Keith G. BS07, MS07
Perkins, Gregory Wayne BS96, MS99
Perkins, Steven Blaine BS81
Perosyan, Nansen BS00
Perrett, Tim BS71
Perriere, Andrea MS01
Perry, Jeffrey E BS10
Perry, Nathan Cannon BS07, MS09
Pestana, Carol Ann BA95
Peterson, Beth Linford BS10
Peterson, David Alan BA00
Peterson, Janene Rigby BA88
Peterson, Sterling Gary BS11
Peterson, Wade Jay BA92
Peterson, Willis Lauritz III BS03, MS05
Peterson, Aaron MS07
Peterson, Alan Harold BS63
Peterson, Brenda F BS99
Peterson, Carol Jean Johnson BS78
Peterson, Dale Ervin BA65
Peterson, Ella Ann BA96
Peterson, James LeRoy BS59
Peterson, Norman L. BS67
Peterson, Ruth Ann BA85
Peterson, Scott J. BS84
Peterson, Sheri Lyn BA84
Peterson, Vere L. BS70, MA76
Pew, Robyn Staker BA97
Pfeifer, Jan Marie MS88
Pfister, Michelle Moesser BA86
Phillips, Amy Lee Freeman BA96
Phillips, Daniel Thomas BS08
Pickett, Casey Robert BS10
Pierce, Calvin William BA85
Pierce, Gerald Patrick BS93
Pierce, Matthew Nicholson BA88, MS91
Pilgrim, Della BA91
Pitcher, Dan Bingham BS86
Pittard, Keri Lyn BS03
Pitts, Jan Lyn MS94
Plaster, Deidre Wynn Whitehead BA95
Plater, Ryan Jacob BS12
Plewe, Brandon Stanley BS92
Poai, Emily BS12
Pocock, Christopher Richard BS03
Poffenberger, Jason Todd BS94
Polay, Elizabeth BS06
Politis, Constantinos BS61
Poole, Keith Sterling BS83
Pope, Juanita Fay Jones BS65, MS68
Pope, Robert Theodore BS97
Popp, William James BS66
Porter, Dorie Jo BA91
Porter, Julia Marie BA89
Porter, Sonja Rae BA85
Porter, Wayne Stanton BS92
Potter, Heather L. BS06
Poulsen, Brent MA96
Poulson, Allen R. MA68
Powell, Jennifer Mae BA98
Powell, Kevin James BS07, MS09
Preator, Stacey May BA96
Prescott, Sherry Lynn Hoke BS67
Prestwich, Paula Jeffery BA98
Prete, Christine Del BS87
Price, Carin Angela BS95
Price, Cynthia Romaine BA99
Price, Jeffrey Grant BA92
Price, Lori Ann BA88
Price, Melissa Simek BS11
Price, Pamela Sue BA98
Price, Shawn BA96
Prichett, Clair Jay BS93
Priddis, Nathan C. BS07, MS09
Pringles, James Kenneth BS12
Prichett, Troy James BS88
Pruden, Katie Celeste BS11
Pryor, Amy Sidaway BS98
Pullum, Joan K. BS73
Purdy, Deanna Lee BA95
Pykles, Liesz Brigitte BA99
Pyle, Mariah Ellen BA92
Pyne, Robert J BA98

QQQ
Quast, Stacie Marie BS10
Quimby, Michael James BS07
Quinlan, Grant W. BS88
Quinn, Melissa Brown BA00

RRR
Rackham, Kimberly M. BS92
Rackliffe, Vincent Brian BS91
Radoff, Rachel Gardiner BS01
Ramberg, Candice J. BA92
Ramsey, John William Philip BS89
Randall, Alfred Raymond BS66
Randall, Melvin Kay BS65
Rands, Lisa BA99
Rapp, Ryan Charles BS08
Rasband, George C. MA76
Rasmussen, Alene A BA89
Rasmussen, Carl Martin BS68
Rasmussen, David L. BS70, MS71
Rasmussen, Paul Moyle BS66
Rasmussen, Randall John BA91
Rathnakumara, Himal BS09
Rauch, Kathleen Anne Batt BA74
Rawson, Sara Jean BS02
Raynes, Denise Grace BS97, MS99
Read, Christopher Paul BS12
Read, Diane Sue BS66
Read, Kenneth John BS77
Ream, Robert N. MS89
Reber, Julie Q. BA96
Reckseen, Don M. BA62
Redd, Preston Tanner BS11
Redd, Stephanie BS07
Redd, Tylor Hardison BS09
Redfield, Terry BS73
Redlin, Kara Mae BS04
Reed, Christi Ann BA92
Reed, Donald W. BS61
Reeder, Joyce BA73
Reeder, Michael William BS71
Rees, Kenneth William BS74
Reese, D. Kirk BS87
Reese, Jonathan Lance BS98
Reese, L. Eugene MS61
Reeve, Julie Ann BS87
Reeves, Donald L. BS59
Reeves, Kenneth David MA95
Reid, Malcolm E. BS75
Reimer, Robert Todd BA93
Reinhardt, Elsa Leana BA99
Remund, Kelly Anne BA87
Rencher, Alvin C. BS59, MS62
Rencher, Meadena Jill Harker BS79
Rencher, Tamla BA73
Rennie, Robert Richard BS61, MS63
Rew, Howard Edward, Jr. BS77
Rex, Ronald Dee BA62
Reynolds, Carol L. Richardson BS65, MS67
Reynolds, Stacy Loraine BA95
Reynolds, Wayne MA77
Rhoades, Kami Cheree BA99
Rhodes, JoAnn BA87
Rice, Heather Marie BA00
Rice, Melany Lynn BA00
Rich, Adam Lee BS04
Rich, Janis Lynn BS71
Rich, Michael Jared BA00
Richards, Arlyn Bingham BS72
Richards, Daniel T. BS96
Richards, Douglas Joseph BA74
Richards, Ezra Wade BS99
Richards, James Mack BS68
Richards, Katie Krystal Hunsaker BS09
Richards, Larry Arnold BS64
Richardson, Amanda Dove BA91
Richardson, Brian John BS80
Richardson, Carol Olita BS65
Richardson, Clarence Wendell BS66
Richardson, Debra Denninghoff BA95
Richardson, Donald Arrell BS70
Richardson, Elizabeth Faye BA93
Richardson, Michele Irene BA93
Richey, Innette BA91
Richmond, Deana June Thornock BS88, MS93
Richmond, Kathleen Lynn BA87
Rickett, Aaron William BS12
Ricks, Alan D. BS76
Ricks, Douglas W. BS71, MS72
Ricks, Jeremy Lon BS01
Ricks, Pamela Dean BA92
Ricks, Russell Matthew BS08, MS10
Ricks, Thomas Earl BA01
Riddle, Marcia Ling BA07, MS03
Rigby, Brad L BS98
Rigby, Colleen BA80
Rigby, Jana Rae BA96, MA00
Riggs, William Quentin BS53
Rigley, Michael Clay BS07
Riley, Cynthia Spencer BA91
Rimmasch, Gretchen BS99, MS03, PhD08
Ringger, Eric Karl BS92
Rippy, Scott Randall BA90
Ritchie, Jennie Elisabeth BA93
Roach, Jay Alan BS84
Robbins, Deyce Lee BA99
Robeck, Laura Knight BS05
Roberts, Deffie Lynn BS85
Roberts, Mark Everett BS83
Roberts, Sharleen MS06
Roberts, Stanley B. BA57
Robertson, Alice Mary BA99
Robertson, Brandi Lynn Taylor BA00
Robertson, James M. BS66
Robertson, John Wesley BS93
Robertson, Lent Mark BS90
Robertson, Randall James BS96
Robinson, Allen Conrad BS79
Robinson, Aubrey Leigh BA01
Robinson, E. Allyn BS68
Robinson, John Frederick BS04
Robinson, Michael John BS75
Robison, Denis Mark BS79
Robison, Heather R. BA92
Robison, Ronald Elwin BS63
Rockwood, Alyn Paul BS71
Rockwood, Jill Forbes BA90
Rocque, Rebecca Homedew BA92
Roderick, Thomas Edward BS07
Rodgers, Jeffrey J. BS82
Rogers, Garth Olsen BS54
Rogers, Julie Brinton MS03
Rogers, Kenneth H. BS54
Rogers, Morgan Kay BS12
Rohrer, Rebekah Ann BS07
Rolf, Brittani Kaye BS07
Rolfe, Russell Dee BA78
Rolling, Alan Boyd BS76, MS76
Rollins, Clinton Hayward BS12
Romer, Brandy Faye BS97
Romito, A. Scott BS79, MS80
Romney, Matthew Daniel BS12
Romrell, Danae MS02
Roper, Karen MA96
Roper, Paul Ross BS76
Rose, Amy Lee BA00
Rosengren, Wayne Bennet BS07, MS08
Rosenquist, Douglas Alan BS94, MS96
Rosiak, Ryszard Stanislaw
Rosier, Amy BA96
Ross, John Jacob BS11
Rothas, Erin Elizabeth BA98
Rounds, Teresa Ann BA85
Roundy, Ellen BS67
Roundy, Robin Otho BS78, MS80
Rowberry, Kyle Stephen BS77
Rowe, Chantelle BS05
Rowley, Isabel Bown BA75
Rowley, Rebecca Marie BS08
Rowntree, Pamela J. BA95
Royal, Rhonda Renee BA90
Royce, Steven James BA97
Ruchti, Cynthia MA00
Rudd, Keith C. BS07
Ruggles, Colleen BS10
Rummler, Alyson Barney BA94
Rupper, Pamela BS09
Rushton, Brian Craig BS07, MS09, PhD12
Russell, Annie Thomas BA96
Russell, David S. BS96, MS98
Russell, Gina Marie BS08
Russell, Kenneth Dale BS75
Russell, Warren Keith BS68
Ruth, Edwin S. BA75
Rygg, Darwin M. BS68
Ryting, Barbara Jo BA86

SSS
Saatkamp, Loni Ann BA90
Sager, Catherine Marie BS87
Sainsbury, Janalyn Jenson BA91
Salay, Peter Allen BA01
Salisbury, Jennie Lynn BS77
Salmon, Douglas BS70
Sampson, Donald Charles BS10, MS12
Sandberg, Jane Katharine McKay BA75
Sanders, Craig Raymond McKay BS83
Sanders, Kristine Newbold BS83
Sanderson, Stephanie BS98
Santana, Tanya Michelle BS12
Sargent, Nicole Neider BA95
Sasser, Gerald Eldo, Jr. BS70
Sato, Keiko BS96
Saunders, Julie Roberts BA93
Saunders, Larry Ellison BS65, MS68
Savage, Shelly Lynne Summerhayes BA88
Scalmanini, James R. BS64
Scarzella, Gerald Jean-Marc BA86
Schalje, Gary Bryce BS77
Schade, Armand Dennis BS66
Schaffer, Zonda Doré BS87
Schunze, Alice M. BA65
Schena, Gino MA96
Schiess, Kathryn R. BS79
Schmid, John Richard BA61, MS63
Schnebly, Joseph Flake BA99
Schnebly, Zoe Marie BA98
Schnell, Linda Thurman BA62
Schoenhals, Robert Michael BS11
Schofield, Jennifer L. MS09
Schone, Patrick John BS90, MS91
Schooff, Richard Maury BS84
Schwartz, David A. BS91
Schwartz, Karen Amy BA95, MA97
Scott, Brian Robert BS88
Scott, Heather Elaine BA99
Scott, Jennifer BA99
Scott, Kenneth Eugene BS91
Scott, Kyle Donald BS94
Scott, Marcus W. BS07
Scott, Matthew Thomas BS12
Scott, Sherry Ann BA98
Scoville, Claudia Jean BA81
Seader, James Robert BS72
Seaman, Daylyn Thompson BA96
Seaman, Delene Aldredge BA98
Searle, Richard Maurice BS67
Sedillo, Gwendolen Andrews BA88
Seegmiller, Craig Douglas BA86
Seegmiller, Renae MA96
Seely, Merrily Ann Johnson BA90
Seppi, Kendall Elisabeth BS11
Serna, Julie Ann BA97
Settle, Josephine Seely BS96
Severn, Malinda Dee Lloyd BA95
Severn, Malinda Dee Lloyd BA98
Sexton, William Nelson BS12
Shackelford, John Samuel BS12
Shaffer, Monte Jasen BA97
Shapiro, Arlyn Gene BA76
Sharp, Robert M. BS59
Sharpley, Dale S., II MS75
Shaw, Barbara Annette Fry BA78
Shaw, John Theodore BS70
Shaw, Mary Brynn BS03
Shaw, Stacey May BA95
Shawcroft, Paul Howard BS87, PhD94
Sheets, Spencer Garner BS61
Sheffer, Dean B. BA76
Shelley, Royce Steward BS77, MS88
Shellman, Valori Dawn BS96
Shepley, Richard Allen BS74, MA76
Sheridan, Shauna White BA91
Shi, Junping PhD98
Shih, Daniel Fok-Yuen BS71
Shirk, Cara Leslie BA00
Shirk, Kari Peterson BA00
Shirley, Val Gene BS64, MS66
Shirts, Shana Gaye BA99
Short, Anne Marie BS91
Short, Stephanie Gale BA97
Shull, Andrew Perry BS92, MS94
Shultz, Virgil R. BA77
Shuman, Daniel Ephraim BS94
Shumway, Beth BS11
Shumway, Diane M. BA76
Sidwar, Megan Alane BS04
Siebert, Daniel Kevin BS89, MS93
Simmons, Forest Wayne BS77
Simmons, Skyler Clayson BS09, MS11
Simmons, William Daniel BS04, MS07
Simons, Joe Miles BS86, MS89
Simpson, Curtis Jon BS68
Simpson, Glen Edward MS04
Sinkovic, John Henry III BS04, MS06
Skabelund, Dane Christian BS11
Skidmore, Allen Royal BA95
Skousen, Kenneth Willard BS62
Slack, Lee Louise Slater BS76
Slade, Sarah Ruth Pixton BA94
Slagowski, Amy White BA97
Slater, Lee Louise BS75
Slauson, Katherine J. BA76
Smart, Kathleen G. BS68
Smith, Alexander R. BS69
Smith, Anthony Dale BS94
Smith, Cameron Arthur BA89
Smith, Carey Alan BS77
Smith, Carolyn MS66
Smith, Curtis Bruce BA85
Smith, Daryl T. BS91
Smith, David LeGrande BS91, MS93
Smith, Gary Richard BS67, MA78
Smith, James Norman BS58
Smith, Jeanine BA77
Smith, John Otto BA77, BS77
Smith, Kelly Lynne BS95
Smith, Kristine Scoville BA83
Smith, Larry Kay BS84
Smith, Layne T BA01
Smith, Lynae Del BA90
Smith, Lynell D BS94
Smith, Marc Alan BS87
Smith, Marci Almond BA95
Smith, Marla Rae Ireland BA85
Smith, Mary Sue Scoville BA99
Smith, Paul Bryon BS00
Smith, Randy David BS97
Smith, Richard Frank BA74
Smith, Sabrina Dawn BS91
Smith, Sara Elizabeth Wyne BA97
Smith, Wayne John BA86
Smithson, Amy Lisa BA97
Smoot, Sara BS04
Smurthwaite, Richard Glenn BS77
Snarr, Sara Elizabeth Broadbent BS98
Sneddon, Ellen May BA97
Sneddon, Katherine BS94
Sneddon, Lynsey Lane BA97
Snelson, Ralph J. MS71
Snow, Tania Lee BS84
Soderborg, Nathan Ray BS86
Solomon, Wendy Ann Jakins BA90
Song, Jae Keun BS84
Sonnewald, Fredrick Llewellyn BS91
Sookhoo, Roy P. BS86
Sorenson, Eden F. BA99
Sorenson, Heather Elaine BA95
Soto, Jessica John BA97
Spangler, Mandy Kaye BA96
Spencer, Bret C. BS77
Spencer, David M BS88
Spencer, JoAnne F. BS96
Spencer, Kristie Ann BA01
Sperry, Annette Snow BA81
Staffanson, Sharon Ruth BA95
Stafford, Julie BA97
Standifird, Carrie BA99
Standifird, Vance Blaine BS69
Stanford, Theodore Barney BS86
Stanger, Kevin E. BA84
Stanley, Jennifer Christensen BA94
Stanley, Jennifer MA00
Stapp, John Milo BS84
Starkweather, Laurel Ann BA99
Starrs, Sharolyn Wright BA93
Stay, Douglas Alan Summers BA00
Steadman, David Gene BS71
Steele, Catharine Sudholt BA95
Stein, Robert Dee BA64
Steig, Mary J. MS76
Steinburg, Neil Evan BS12
Steemmons, Eric Dwain BS93, MS95
Stephens, David Allen BS79
Stephens, Robert T. BS66
Stephenson, Jill BA81
Sterling, Gretchen Gayle BA99
Stevens, Christina Demery BA84
Stevens, Evan McAllister BS11
Stevens, Jonathan Michael BS11
Stevens, Margrethe L. BA00
Stevens, Michael C. BA96
Stevens, Michael Clair BA85
Stevens, Norman Howard BA75
Stevens, Shawn Marie BA91
Stewart, Andrea Dawn BA99
Stewart, Kelli Jo BS08
Stewart, Steven Keith BA86
Stillman, Leonard M., Jr. BS67
Stine, Brian Lyle BS79
Stinson, Deena Kay BA96
Stinson, Jerry Lee BS72
Stitt, Diane BA73
Stockett, Zack T. BS80
Stoddard, Jared Evan BA92
Stoker, Nathan R BS10
Stone, Larry Craig BS68, MS70
Stone, Stephanie BA92
Stone, Tiarerangi Renee BA91
Stones, Ryan Dean BS01
Stoops, Linford Ronald BS58
Storrs, Ember Eskelson BA91
Stosich, Gina Louise BA77
Stoskus, Tomas Vytaitas BS96
Stotts, Heather Garr BA97
Stout, Melinda Ruth BA99
Stout, W. Bryan BS81
Stovall, John E BS04
Stowell, Erin Elizabeth BA97
Strain, Danny Hal BA96
Strang, John Douglas BS68
Stratford, Angela BA96
Strong, David Moroni BS92
Strong, Jeffrey A BA88
Strong, Jennifer Lynn BA96
Strong, Kathleen BA91
Strong, Nancy Lynn BA95
Struksma, Michael Dennis BA80
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Stuckey, Russell Dwight BA53
Stucki, Julia Ann BA96
Stucki, Tawnya Joy BA95
Stumpe, Reginald H. BA76
Stuy, Melissa Ann BA90
Sudweeks, Michelle BA99
Sue, Lawrence Gene BS67
Suggs, Rachel Megan BS12
Sullivan, Carole Bunnell BA91, MA98
Summers, Erin E. MS02
Summers, Larry Allen BS78
Sundrud, Blaine Elliot BA95
Sundrud, Tyler Reed BS96
Sutorius, Janet May BA88, MA96
Svedin, Christian Thorup BS75
Swallberg, Tonia Landon BA93
Swensen, Annette BA83
Swenson, Eric Lewis BS87, PhD93

TTT
Taggart, Denise Kay BA87
Takara, Cary Yuita BA99
Takara, Shinsei BS74
Talbot, Mary Noel BA00
Talley, Carol Ann BA99
Tamura, Kazuyo BS85
Tang, Marin Ann Pearson BA99
Tanner, David Reed BA89
Tanner, Stephen Will BS95
Tappen, Henry P BS10
Tarbox, Dawn J. MS70
Tasso, Margaret BA84
Tay, Julian Boon Kai BS07
Taylor, David Albert BA91
Taylor, James Benjamin
Taylor, James Benjamin, Jr. BS08, MS10
Taylor, Karen C. MA91
Taylor, Kristin BS95, MS98
Taylor, Leland James BS99
Taylor, Michael DeMar BS84
Taylor, Paul Dee BS85
Taylor, Robert Ether BS70
Taylor, Stephen Michael BS05, MS07
Taysom, Richard Ray BS62, MS64
Teemant, Leo BS10
Teemant, Merrill BS91
Terrazas, Michael Stephen BS81
Teuscher, Dawn BA94
Thacker, Brandon “K” BA82
Thalman, Elaine Elha BA98
Thelin, Stephen Murray BS81
Thomas, Andrea BA99
Thomas, Barbara Helen Franklin BA75
Thomas, Henry Richard BS12
Thomas, Lori Annette Oviatt BA89, MA91
Thomas, Richard David BA86
Thomas, Steven Mark BS70
Thomas, Toni BS06
Thompson, Charles Robert BS74
Thompson, Don David BS71
Thompson, Emily Baird BA96
Thompson, Gina Ambrose Nasca BS98
Thompson, Gregory Lynn BA99
Thompson, Julie Dowdle MS92
Thompson, Melanie Poelman BA92
Thompson, Mitchell D. BS71
Thompson, Neil BS73
Thompson, Teresa Ann BA90
Thomson, Jan McDonald MS95
Thorley, Steven R. BS79
Thornton, Blake BS95
Thornton, Daryl Israelson BA78
Thornton, Deveri Wilcock BA96
Thorpe, Edgar Blair BA81
Thorpe, Gia Beth BA93
Thorpe, Ronald Glen BA97
Throolin, Harold Gardner BS77, MS83
Thurber, Mark J. BS80
Thwaites, Julie L. Bowen BA94
Tibbits, Sean Michael BS05
Tietjen, Gary L. MS61
Tindall, Steven V. BS80
Ting, Loong BS65
Tingey, Shelley Dawn McGee BS85
Tingey, Thomas J. BS66
Tipton, Jay V. BS71
Tlustek, Marthea Lynann BA95
Tolman, David Claudius MS61
Tolman, L. Kirk BS60
Toma, Rikuo BS70
Tomlinson, Robert Terry BS95
Torres, Terri Lynn Burdette BA81
Treonor, Amy Kerchinsky BA94
Tree, Donna Rae Jackson BA83
Tree, Ellen Jane BA91
Tree, Randy G BA89
Tripp, Allysen BS90
Tripp, Leonard Lee BS65, MS67
Trombly, Adam Michael BS11
Trunnell, Lisa BA01
Truong, Minh Nguyen Duy BS10
Tschanz, Pamela Michelle BA75, MA81
Tsukamoto, Calvin M. BS67
Tsunoda, Hiroshi BS84
Tucker, Christine Lina Brunner BA93
Tucker, Janessa Kathleen
Tuckfield, Bradford James BS11
Tuft, Jaimee Jeanne BS10
Tuft, Vivian Ruth BA85
Tuitupou, Metiline Liolaina BA98
Turley, Deon Staffanson BS81
Turley, Hilary Nan BA99
Turley, Patrick A BS10
Turner, David O. BA75
Turner, Elizabeth Marie BA00
Turner, Emma Louise Rode MS99, PhD12
Twede, Darren J. BS92
Tweed, William Allen BS90
Tyler, Fenton Hunt BS67
Tyler, Jonathan Glen MS07

UUU
Udall, David Stewart BS92
Uhl, Stephanie Nicole BS12
Uluave, Sione A. MA74
Um, Ki Chong BS66, MS68
Uno, Chie BS78

VVV
Va’ivaka, Molitika Paongo MA84
Valentine, Roy R. BA54
Valdez, Jose Baldemar, Jr. BA98
Valencic, Tabitha Noel BA97
Valenzuela, Sebastian Ignacio Acosta MS11
van Matre, Megan Ilene BS09
Van Orman, Helen Elizabeth Gardner MA90
Van Tassell, Natalie BS07
Vance, Tara Danielle BS93
VandenBos, Marsia M. BA90
VanSlooten, Juliana BA93
Vaughn, Regan S. BS03
Vause, Rande BS68
Veibell, Matthew Todd BS10
Verhaaren, Christopher Bruce BS09
Vernon, Carolee Furr BA98
VerNooy, Stanley DuBois BS68
Vetterlein, David H. BS72, MS77
Victors, Mason Lemonye BS11
Viertel, Ryan D BS12
Visher, Even Rockwell Sharpe BA74
Visker, Cherie Palmer BA98
Vittal, John J. BS69
Vogelsberg, Chris Alan BS75
Vogelsberg, Gary W. BA77
Vogelsberg, Robert BS81
Vogler, John Richard BS00, MS01
Voisin, Gregory Stephen BS86
Vom Lehn, John Christian BS09
Vorwaller, Jaine Adams BA99
Voyles, Jaqueline Taylor MA76

WWW
Wade, Darryl Gene BS05, MS08
Wade, David Staley BS85
Wade, Gerald Omer BS69
Walton, Alan Arthur BS10
Walton, Charlotte BS06
Wang, Junping PhD99
Ward, Brady Douglas BA96
Ward, Candice Marett BS10
Ward, David Pratt BS80
Ward, Erika Knight BA00
Ward, Lance Delbert BS90, MS92
Ward, Robyn Tolman BA91
Ware, LeRon MA96
Warner, Benjamin Youell BS08
Warnick, Karl Foster BS93
Warr, Frank William BS68
Warr, John Lynn BS70
Wasden, Karla Ann BA97
Watabe, Masaji BS68, MS70
Watanabe, Azusa T. BS83
Watanabe, Masasue BS84
Watanabe, Yumi BS98
Waters, Rebecca Joan BA94
Watkins, Allyson C. MA78
Watkins, Christina Cook BA90
Watkins, Christina Cook BA98
Watkins, David Joseph BS02
Watson, Scott Michael BS99
Watts, Krista Marie BA95
Wax, Ronald BS68
Webb, Benjamin Zachary BS02, MS04
Webb, Carri Ann BA98
Webb, Jared Anthony BS10
Webb, Kimara Kathleen BA97
Webb, Matthew Michael BA00
Webber, Jonathan S. BA87
Weber, Bonnie Jilene Hoggan BA60
Weber, Craig Richard BA74
Weber, Matthew Barnett BS02, MS04
Weeks, Russell Alger BA77
Weiler, Colleen BA92
Weinberg, Lindsay Mae BS04
Weingartner, Andreas PhD98
Weingartner, Cecelia Lok MS97
Weinstein, Berthold BS71
Welker, Kris BA86
Welker, Nina Marie BS94
Wells, Brian S. BS81
Wells, Melissa Dickson BS11
Wells, Rebecca S. BA77
Wells, Wendy Kay BA95
Wendel, John David BS87
Wendel, Rebecca M. BA96
Wendel, Rebecca Marie Mitchell BA99
Weng, Tuan-I BA93
Wermes, Julie Rae BA93
Werrett, W. Paul BS67
West, Jeremy Michael BS07, MS09
West, Nancy BA74
West, Samuel K. BA75, BS75
Western, Kandelyn Richins BA00
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XXX
Xie, Zhifu PhD06
Xun, Jian Ping PhD93

YYY
Yablonovsky, Martin Andrew BA98
Yamakawa, Suzuka BA74
Yamaoka, Hideki BS96
Yamauchi, Kazuo BS84, MS86
Yan, Alice Chi-Fong BS71
Yan, Duokui PhD09
Yandle, Sheri Elizabeth BS93
Yao, Xiao BS09
Yau, Patsy BS85
Yaucey, Amanda Louise BA00
Yazzie, Maria Antonietta BA87
Yeates, James Loren BS57
Yee, Manao Choyoi BS82
Yetter, Scott Lawrence BA94
Yeung, Enoch Ho-Yee BS10
Yocom, Michael Warren BA85, MA91
Yoon, Eenja BA88
Yorgesen, David Frans BS64, MS67
Yorgesen, Jerry Leon BA96
Yoshimoto, Stacey Sakae BS86
Young, Andrea BS92
Young, April BS98
Young, Douglas Arden BS69
Young, Heather BA95
Young, Jennifer Suzanne BA94
Young, Mary H. MA91
Young, Stacy Gyllenskog BS92
Yssel, Anna Kay BA95

ZZZ
Zachreson, Sarah A. BA00
Zackrison, Dorothy Lenore Widtfeldt BA75
Zaharis, Karen Lee Mason BA88
Zaifnajad, Ellen Sanders BA89
Zang, Kenneth E. BS73
Zeng, Chongchun PhD97
Zetterquist, Kimberly BA98
Zhang, Ping MS90
Zhou, Ximing MS93
Zick, Tiffany Lynne BA95
Zimmerman, James Thorvald BS99
Zmolek, Andrew C BS94
Zobell, Eric Jensen BA90
Zogg, Samuel Robert BA00
Zogg, T. Murray II BA97
Zundel, Norman Don BA73
Zwahlen, Brian J. BS96
Appendix 6. List of Graduates by Year

1949
B. S. (2)
Ford, Orlin E.
Howard, Grant C.

1953
B. A. (7)
Farr, Golden R.
Hill, Richard Wayne
Kullick, Edward Jacobs
Larsen, Reed
Pedersen, Allen Dean
Pincock, George D.
Stuckey, Russell Dwight

B. S. (5)
Ballif, Jae Romney
Christensen, Harold P.
Christensen, Hyrum Able
Cox, Melvin Wesley
Riggs, William Quentin

1954
B. A. (1)
Valantine, Roy R.
B. S. (8)
Allred, Wendell U.
Billings, Victor Dunn
Bingham, Neil Durrant
Christensen, Harold Parley
Gibby, Marlow David
Ord, Richard Neil
Rogers, Garth Olsen
Rogers, Kenneth H.

1955
B. A. (1)
Brown, Franklin Willis
B. S. (5)
Allred, Blake Burns
Buchanan, Richard M.
Durrant, Eugene Jay
Lamson, Merle Edwin
Pedersen, Jean J.

1956
B. S. (8)
Affleck, Diane
Beardsley, Bruce Marvin
Burton, Robert Corry
Goodwin, Diane A.
Harris, Lloyda Mae
Jorgenson, Phil M.
Noker, Alvin John
Wrathall, Claud Prior

M. S. (2)
Gardner, Willard Hale
Larsen, Kenneth M.

1957
B. A. (3)
Harris, Frank Danvelle
Roberts, Stanley B.
Wille, Milton George
B. S. (7)
Anderson, Garron Perry
Bennett, Douglas Roger
Cook, William A.
Day, Clark Harris
Hanson, June Howard
Hillon, Wilford Bruce
Yeates, James Loren

M. S. (1)
Woodfield, Norman R.

1958
B. A. (5)
Charles, Marlene P.
Davis, Lorin Richard
Higgins, John
Pack, Elbert Chandler
Linebarger, Robert Neal
B. S. (15)
Adams, Barbara June
Adams, Joseph Neil
Beecroft, James Lewis
Belnap, Richard Duane
Bird, Talmage C., Jr.
Clark, Donald Dean
Fletcher, Donald Eugene
Gill, Gurcharan Singh
Hansen, Ray Richard
Marshall, Neldon Hayes
Mason, Sterling Alma
McBride, Clarence Edward
Smith, James Norman
Stoops, Linford Ronald
Taylor, Paul Dee

1959
B. A. (1)
Byers, Kenneth W.
B. S. (12)
Anderson, Gale Y.
Binch, Wayne George
Bingham, James R.
Evans, Morgan J.
Hope, Arthur Carl
Jackson, Weldon Francis
Nelson, Alvin John, Jr.
Peterson, James LeRoy
Reeves, Donald L.
Rencher, Alvin C.
Sharp, Robert M.
Walker, Verdon Reed

1960
B. A. (2)
Hatch, D. Diane
Weber, Bonnie Jilene Hoggan
B. S. (9)
Atkerson, Christine
Crawford, Myron Lloyd
Draper, Otto L.
Knight, Ronald A.
Lamoreaux, Jack Wayne
Lyman, Richard Gee
Magaoy, Juan
Olsen, Richard Alan
Tolman, L. Kirk
M. S. (1)
Higgins, John C.

1961
B. A. (2)
Beus, H. Lynn
Schmid, John Richard
B. S. (13)
Day, Lavelle
Johnson, William Carl
Baldauf, Martha Marie
Farmakis, Demetrios K.
Gilchrest, Alan Curtis
Harmon, George E.
Keliilik, John Parker
Mahbod, Mahmoud
Papenfuss, Joseph K.
Politis, Constantinos
Reed, Donald W.
Rennie, Robert Richard
Sheets, Spencer Garner
M. S. (6)
Anderson, Garron P.
Canfield, Ronald Virgil
Keller, Elmo A.
Reese, L. Eugene
Tietjen, Gary L.
Tolman, David Claudius

1962
B. A. (6)
Beus, Gary Boyd
Mufich, Carolyn Lee
Reckseen, Don M.
Rex, Ronald Dee
Schnell, Linda Thurman

Wright, Kenneth D., Jr.
B. S. (8)
Burk, Erlan
Fielding, Joseph Ray
Garner, Lynn E.
Leavitt, Richard A.
Olsen, Darwin
Skousen, Kenneth Willard
Tebbs, Richard Ray
Wistisen, Martin J.
M. S. (3)
Knight, Ronald A.
Mason, Sterling A.
Rencher, Alvin C.

1963
B. A. (3)
Anhalt, Mary Jo Alleman
Crandall, Vern J.
White, Allen Jay
B. S. (19)
Armstrong, Gerald M.
Bailey, DuWayne Cole
Booth, Gordon Dixon
Broadbent, Dale Jay
Carson, Gerald George
Compton, George Richard
Crowley, Jared Orson
Dorius, David O.
Edwards, Gary C.
Greenhalph, Neil W.
Hall, Andreas F.
Johnson, Carl Mauritz
Lambert, John Carlyle
Lower, Douglas Leland
Manning, Theron H.
McDonald, Robert A.
Peterson, Alan Harold
Robison, Ronald Elwin
Wilcox, Robert Earl
M. S. (4)
Bone, Brian
Merrill, Paul K.
Rennie, Robert R.
Schmid, John R.

1964
B. A. (4)
Bahen, Gordon
Draper, Arthur Zemira
Janes, Norbert
Steen, Robert Dee
B. S. (12)
Eatough, Judith Pursley
Goodrich, Roger E.
Harrison, Dennis Eugene
Jacobs, Richard West
Kimball, Larry Robert
McLaughlin, John Robert
Meade, John B.
Owens, Jerry Lance
Richards, Larry Arnold
Scalmanini, James R.
Shirley, Val Gene
Yorgesen, David Frans
M. S. (1)
Tebbs, Richard

1965
B. A. (6)
Forsnes, Elaine Ann
Guymon, Vernon Melvin Jr.
Jones, Elizabeth Ann Merrill
Love, Alice Ann McBeth
Peterson, Dale Ervin
Schanze, Alice M.
B. S. (20)
Cannon, Ruth Lynne
Coy, Jean Afton
Dearinger, William Carlton II
Gates, Dorothy L.
Ivie, Waine Otto
Johnson, Barbara Ellen
Johnson, R. Kent
Kim, Ye Won
Lewis, Chester Everett, II
McMaster, Kirby Malcolm
Newson, Ronald Ralph
Pope, Juanita Jones
Randall, Melvin Kay
Reynolds, Carol R.
Richardson, Carol Lolita
Saunders, Larry Ellison
Ting, Loong
Tripp, Leonard Lee
Whisenant, Vernis C., Jr.
Wynn, Alden Chapin
M. S. (1)
Armstrong, Gerald M.

1966
B. A. (3)
Coombs, Richard J. Jr.
Davies, Ric Courtney
Galbraith, Bruce H.
B. S. (31)
Allen, Robert George
Anderson, Betty Fae Buie
Call, Anson Vee
Condie, Sheryl Anne
Crockett, Robert N.
Ford, Robert Calvin
Gittins, Gary Haslam
Haggerty, John F., Jr.
Hintze, Sharon
Hoaglund, Gordon Wood

Huber, Carole
Jones, Heber Warren
Kekumano, David L.
Kelliiiki, Dale K.
McMaster, Bruce Marshall
Parry, Vinette
Paul, Erich Robert
Peterson, Thomas Flay
Popp, William James
Randall, Alfred Raymond
Rasmussen, Paul Moyle
Read, Diane Sue
Richardson, Clarence Wendell
Robertson, James M.
Schade, Armand Dennis
Stephens, Robert T.
Tingey, Thomas J.
Um, Ki Chong
Walker, Merle LaMar Jr.
Williams, William A.
Woolley, Susan Irene
M. A. (1)
Paulsen, Dick R.
M. S. (8)
Ferguson, H. Rolfe
Jacobs, Richard W.
Leonard, Preston L.
McMaster, Kirby
Moore, Barbara
Owens, Jerry L.
Shirley, Val G.
Smith, Carolyn

1967
B. A. (2)
Barlow, Elbert Gene
Jarman, Arthur Lavell
B. S. (32)
Ball, Robert E.
Blaine, Willis J.
Boyce, Dianne
Calaway, James D.
Call, Duane Bowen
Cardon, Boyd Louis
Christensen, Dennis H.
Cromar, Bruce Young
Deete, Donna J.
Evans, Daniel Boone
Garrick, Janet Ruth
Hall, Blaine Dean
Harris, Roger Wright
Harrison, Evan Dean
Lawrence, Robert Jefferies
Lewis, Roderic
Mangleson, Max Lorenzo
Mathis, Donald Forrest
McGrew, John Michael
Meacham, Michael A.
Olcott, Douglas R.
Pearson, Boyd Albert
Peterson, Norman L.
Prescott, Sherry Lynn Hoke
Roundy, Ellen
Searle, Richard Maurice
Smith, Gary Richard
Stillman, Leonard M., Jr.
Sue, Lawrence Gene
Tsukamoto, Calvin M.
Tyler, Fenton Hunt
Werrett, W. Paul

M. S. (6)
Guyman, Vernon Melvin
Hutcheson, Donald H.
Nath, Sukhendu
Reynolds, Carol L. Richardson
Tripp, Leonard
Yorgeson, Carol E.

1968
B. S. (40)
Afaghí, Peter Ehsanollah
Blood, Talman Clifton, Jr.
Boyd, Ward Carson
Brower, Charles Edgar
Brinkerhoff, Mary Suzanne
Christensen, Larry Ray
Doyle, Truman Scott
Fishburn, J. Scot
Flamboe, Ronald Roger
Harrell, Mason Douglas, Jr.
Heywood, James Kay
Hill, Lelon Ronald
Howe, David Kent
Jasperson, Boyd Ralph
Judd, Dorothy Peyton
Lallis, Acel Dee
Lewis, Morgan
Loveridge, Arnold
Lund, Sandra Jean
McKell, Lynn Heber
Mill, Margaret
Nelson, Janet Alma Richards
Nielson, Margaret H.
Patterson, Virgil J.
Rasmussen, Carl Martin
Richards, James Mack
Robinson, E. Allyn
Russell, Warren Keith
Rygg, Darwin M.
Simpson, Curtis Jon
Smart, Kathleen G.
Stone, Larry Craig
Strang, John Douglas
Vause, Rande
VerNooy, Stanley DuBois
Warr, Frank William

1969
B. A. (1)
Hart, Lewis W.

B. S. (30)
Bair, Larry Keith
Barangerter Suezan
Bartholomew, Daniel
Barton, Judith Kay
Baugh, Steven Clare
Burtle, Joseph Worsley
Call, Eugene S.
Cardon, Royal Lavor
Cannon, Susan
Chivers, Laurie Alice
Cooper, Thayne Carl
Crawford, Linda Lee
Findlay, Richard Bruce
Glenn, Val D.
Gho, Carol B.
Gordon, Lela Marler
Hart, Lewis W.
Harward, Leland Kay
Hinton, Lynn Bernard
Loveridge, Robert
Madden, Michael J.
Moss, William Francis, Jr.
Palmer, John Franklin II
Nielson, Richard G.
Smith, Alexander R.
Standifird, Vance Blaine
Vittal, John J.
Wade, Gerald Omer
Woodward, George Val
Young, Douglas Arden

M. S. (5)
Anderson, Betty B.
Carey, Ernest L.
Fisher, Ellen Roundy
Hall, Blaine Dean
White, Allan Jay
1970
B. S. (34)
Armstrong, Diana
Barnes, Annette
DeLange, Clark Denison
Daniels, James W.
Fielding, Garth F.
Gray, Michael Ian
Hansen, Merlin Arvel
Hansen, Russell E.
Harrison, Gary William
Hauber, Mary Jane
Heward, Lynn Paul
Heywood, Joseph Leonard
Knudsen, Randall Johnson
Kotter, Garold Keith
Lindsay, Lynn West
Lords, Lawrence Lee
Lovell, John Collier
Maule, Carol Ann
Miller, Lee Oliver
Peterson, Vere L.
Rasmussen, David L.
Richardson, Donald Ardell
Salmon, Douglas
Sasser, Gerald Eldo, Jr.
Shaw, John Theodore
Solis, Armando
Taylor, Robert Ether
Thomas, Steven Mark
Toma, Rikuo
Warr, John Lynn
Williams, Gerald Anthony
Wilson, Gordon Thomas
Wilson, James Robert
Wright, David Grant

M. S. (16)
Cardon, Boyd Louis
Chen, Roun-Shen
Findlay, Richard Bruce
Jackson, Brent Leland
Kotter, Garold Keith
Loveridge, Arnold V.
McKeague, Charles P.
McMaster, Bruce M.
Muranaka, Nobuo
Oh, Kil J.
Olivier, Vernon L.
Patterson, Virgil J.
Snelson, Ralph J.
Stone, Larry Craig
Tarbox, Dawn J.
Watabe, Masaji

1970
B. A. (2)
Endrizzi, Deborah C.
Gribble, Gerald D.

B. S. (47)
Arnason, Calvin B.
Austin, Steven Gregory
Baker, Loyal Alma
Bettilyon, Verdon Lee
Burton, Patti
Craig, Alan Scott
Carlsruh, Deborah B.
Clements, Robert L.
Crane, John Robert Jackson
Davis, Sandra J
Day, Lee Newel
Edwards, Michael B.
Gardner, Michael Emmett
Gobel, Karen
Hansen, Don R.
Hemingway, Vern Rulon
Henroid, Rosalee D.
Hicks, George William
Hinckley, Clark B.
Hollingshead, Ralph E.
Howard, Laurel Brigette Robison
Hughes, John A.
Hummer, Steven Frank
Hunter, Marlow Christensen
Kagel, Phillip Allen
Landon, Doyle Glen
Lawlor, David Dow
Litchfield, Kay Pierson
Lund, Lawrence Gregory
Malone, Carol Hawker
Mecham, David M.
Mills, Robert Albert
Morris, Jolene Murray
Palmer, Van R.
Perrett, Tim
Rich, Janis Lynn
Reeder, Michael William
Ricks, Douglas W.
Rockwood, Alyn Paul
Shih, Daniel Fok-Yuen
Steadman, David Gene
Thompson, Don David
Thompson, Mitchell D.
Tipton, Jay V.
Weinstein, Berthold
Wilson, Robert William
Yan, Alice Chi-Fong

M. A. (1)
Nielsen, Richard G.

M. S. (5)
Keliliiki, Dale
Nielsen, Richard G.
Paul, Robert
Rasmussen, David
Snelson, Ralph
1972
B. A. (12)
Anderson, O. Robert
Bush, Junola Smith
Butterfield, James F.
Clark, Kim W.
Daugherty, Ronald Jackson
Dorrance, Adelle W.
Edgar, Grover Carl
Ham, Peggy Ann Hawkins
Hartvigsen, Ellen Louise
Merrill, Dixilee
Nelson, Kenneth Ralph
Wilson, Charlene
B. S. (11)
Bailey, David H.
DeLong, Richard Peter, Jr.
Kehr, Robert Webster
Merrill, Cynthia Kay
Pearce, Kent
Richards, Arlyn Bingham
Seader, James Robert
Stinson, Jerry Lee
Vetterlein, David
Walter, Michael Ray
Winn, Stephen Kent
M. S. (5)
Adams, David C.
Hinton, Lynn
Malone, Carol H.
Murray, Norman B.
Ricks, Douglas W.

1973
B. A. (15)
Baird, Margaret Ellen
Benedict, Timothy D.
Billings, Lowell Edwin
Goates, A. Wayne
Hirsbrunner, W. Wayne
Hunt, Russell Lee
McBride, Linda Anne
Neider, Michael Antone
Reeder, Joyce
Rencher, Tamla
Stitt, Diane
Whytlaw, Jame Vincent
Wilson, Barbara Ann
Wright, Kenneth E.
Zundel, Norman Don

B. S. (14)
Allred, Kathie F.
Andelin, Steven Lee
Cavin, Karen S. Johnston
Cox, Barbara Walsh
Doty, Georganne Elaine
Ehat, Andrew F.
Holman, Barbara Ann

Kent, Patricia
Lenzer, Nancy
Lyons, Vicki A.
Pullum, Joan K.
Redfield, Terry
Thompson, Neil
Zang, Kenneth E.
M. S. (1)
Howard, Laurel R.

1974
B. A. (23)
Adams, Carl Richard, Jr.
Bailey, Michael U.
Baker, Tamara Toolson
Bills, Barbara N.
Clark, AmeliaBeatrice Crowfoot
Corey, David L.
Francom, Christine Ann Mathews
Gabrielsen, Randee Kay
Irwin, Deborah Jane
Jones, Gaylan Isaac
Koyle, Mark Hansen
McGhie, Dian
Montierth, Wesley V.
Pace, Randy Reed
Payne, Carolyn Kay
Rauch, Kathileen Anne Batt
Richards, Douglas Joseph
Smith, Richard Frank
Visher, Even Rockwell Sharpe
Weber, Craig Richard
West, Nancy
Wilhite, David Lee
Yamakawa, Suzuki

B. S. (22)
Carteen, Robert L.
Carter, Forrest Devin
Clark, Amelia C.
Clawson, Robert A.
Cooper, Janet Marie Johnson
Davis, Bruce Michael
Duke, Steven Wayne
Heap, David Norman
Hughes, Brent W.
Jackson, Errol Kent
Johnson, Janet Marie
Koyle, Mark H.
Kuttler, Kenneth L.
Mahalko, Eugene D.
Monson, Roland Hintze
Monson, Stephen R.
Pelton, Leslie Gae Francis
Rees, Kenneth William
Shepley, Richard Allen
Takara, Shinsei
Thompson, Charles Robert
Wyckoff, Stephen Kerry
M. A. (2)
Montierth, Wesley V.
Uluave, Sione A.
M. S. (1)
Liu, Chien M.

1975
B. A. (29)
Anderson, Preston Kent
Black, Deborah Joan
Blackham, Diana Lynn
Booth Duane Paul
Cox, Ann
Crowther, Steven B.
Flanders, Pamela T.
Geiger, Denise Morey
Groenig, Robert N.
Hale, D. Brent
Howe, Michelle
Hoyt, Leon Frederick
Lamb, Glenn Doyle
LeSueur, Nancy Lee Rigby
Machula, Myron Eugene
Meyers, Scott Gregory
Mitchell, Eileen Content
Moore, Valerie Marie
Olsen, Deborah B.
Rowley, Isabel Bown
Ruth, Edwin S.
Sandberg, Jane Katharine McKay
Stevens, Norman Howard
Thomas, Barbara Helen Franklin
Tschanz, Pamela Michelle
Turner, David O.
West, Samuel K.
Wimmer, Elmer J.
Zackrison, Dorothy Lenore Widtfeldt
B. S. (25)
Adams, Richard T.
Armstrong, Vaughn Scherbel
Austin, Carolyn Dee Fisk
Bishop, F. Avery
Cannon, Layne Wareing
Casler, David Charles
Chou, Ernest Sheng-Yu
Christensen, Gary Fairfax
Colebeck, William B.
Drake, Danny Lee
Edwards, William Lee
Fakrell, larry J.
Hancock, Lynn R.
Hawks, Vern Revere, Jr.
Heaton, Hal B.
Reid, Malcolm E.
Robinson, Michael John
Russell, Kenneth Dale
Slater, Lee Louise
Svedin, Christian Thorup
Vogelsberg, Chris Alan
West, Samuel K.
Wiltse, Doreen Therese
Woodfield, Scott Norman
Woolf, Steven L.
M. A. (1)
Hale, D. Brent
M. S. (3)
Pearce, Kent
Sharples, Dale S., II
Visher, Eben R. S.

1976
B. A. (15)
Bishop, Bruce Allen
Ferguson, Margaret Lindsay
Jelly, Katherine Louise
Johnson, Cynthia Jeanne Bailey
Johnson, Hagan D.
Larsen, Bart Franklyn
Larsen, Janis T.
Marquette, Diane Leigh
O’Neil, Connie Colleen
Olds, Roger Alan
Shapiro, Arlyn Gene
Sheffer, Dean B.
Shumway, Diane M.
Slauson, Katherine J.
Stumpe, Reginald H.
B. S. (20)
Babiracki, June Irene
Bastow, David Paul
Brothers, William H.
Byron, Edward E.
Chipman, Brent Richard
Crossman, Ronald J.
DuPree, Billy Glenn
Frost, Judylyn Fausett
Ford, Ronald R.
Gardiner, Judith Diane
Goehring, Don D.
Grange, John Robert
Hickman, Steven Robert
Hulet, Dennis J.
Murdock, David Evans
Ricks, Alan D.
Rolling, Alan Boyd
Roper, Paul Ross
Slack, Lee Louise Slater
Wickes, Gene Harry
M. A. (9)
Christensen, James M.
Fielding, Garth F.
Holmes, Frances R.
Lundgreen, Dennis F.
Merrill, Nona M.
Peterson, Vere L.
Rasband, George C.
Shepley, Richard A.
Voyles, Jaqueline Taylor

M. S. (6)
Allison, Charles D.
Doty, Georganne Elaine
Kuttler, Kenneth L.
Rollins, Alan B.
Steig, Mary J.
Wickes, Gene H.

1977
B.A. (28)
Baker, Corinne L.
Bartle, Duane Lewis
Bills, Dale Seth
Cannon, Candis Albers
Courtney, Rebecca Suzan
Cuthbertson, Teresa H.
Dean, Paul Raymond
Denton, Jeanine S.
Elizabeth, Heide H.
Erickson, Ronald W. B.
Giles, Lois G.
Gray, David J.
Gregory, Lois Margaurite
Hicks, Teresa Kay
Kimbell, Heidi Hileman
Lunceford, David Lee
McAffee, Don B.
Morris, Daniel Robert
Ostler, Brian Harold
Otto, Merilee W.
Shultz, Virgil R.
Smith, Jeanine
Smith, John Otto
Stosich, Gina Louise
Vogelsberg, Gary W.
Weeks, Russell Alger
Wells, Rebecca S.
Witt, Merilee Kay

B. S. (33)
Armstrong, William Paul
Barker, Brent Alan
Bills, Dale S.
Birdsall, Mark William
Broadbent, Charles Winkel
Cannon, Candis A.
Cortez, Arnold, Jr.
Cotrell, Jenny L.
Crossman, Ronald J.
Danner, Donald K.
Decker, Carla Ann Hinkle
Fairbanks, Peter Nathan
Gessel, Gary Frederick
Groesbeck, Alan Dickson
Jensen, Delos Clark, Jr.
Lambert, Janeen Pack
McAffee, Don B.

McGhie, Alice Mein Chang
Morin, Brad Lyman
Nelson, Jeffrey W.
Osom, Regina A.
Read, Kenneth John
Rew, Howard Edward, Jr.
Rowberry, Kyle Stephen
Salisbury, Jennie Lynn
Schaalje, Gary Bryce
Shelley, Royce Steward
Simmons, Forest Wayne
Smith, Carey Alan
Smith, John O.
Smurthwaite, Richard Glenn
Spencer, Bret C.
Throolin, Harold Gardner

M. A. (5)
Aragon, Tony D.
Bryant, Rebecca J.
Lundell, J. Lindroth
Olson, Harold C.
Reynolds, Wayne

M. S. (2)
Vetterlein, David H.
Wu, Edward

1978
B. A. (10)
Barnes, Kenneth Leigh
Bushman, Bonnie Kay
DeShazer, Michael Lamond
Eppich, Kevin Lynn
Hawkes, Michel Blaine
Manwaring, Jed Waldon
Moleni, Deborah Annette Nickerson
Rolfe, Russell Dee
Shaw, Barbara Annette Fry
Thornton, Daryl Israelson

B. S. (24)
Anderson, Stephen Mark
Athay, Darrell G.
Callister, James Robert
Cox, Beverly Ann
Frodsham, R. Tim
Hansen, James V.
Hawkins, Bruce
Higginbotham, Dan W.
Hilton, Ronald Nathan
Kite, Christopher Warren
Klingler, Kenneth Duane
Larsen, David Marc
Larson, Donald Russell
Lynd, William Baxter
Moleni, Deborah N.
Mott, Gregory D.
Nelson, Jeffrey W.
Newton, Gregory Clark
Peterson, Carol Jean Johnson
Roundy, Robin Otho  
Summers, Larry Allen  
Wickes, Gwenyth Spencer  
Wilde, Doran K.  
Uno, Chie  

**M. A. (4)**  
Frost, Kenneth B.  
Gill, M. Jean  
Smith, Gary R.  
Watkins, Allyson C.  

**M. S. (1)**  
Grange, John R.  

**1979**  
**B. A. (10)**  
Chambers, Valerie Kathleen  
Crays, Laura K.  
Critchfield, Larry Glen  
Decker, Renae Christine  
Everitt, Renae D.  
Hansen, Kerry Steven  
Hatch, David Nelson  
Hendrickson, Scott Jay  
Kim, Victoria Herbst  
Kintz, Laura Jean  

**B. S. (27)**  
Ashby, Victor Cary  
Bullock, L. Wood  
Burnett, Charles Brewster  
Carter, Bruce Justin, Jr.  
Christensen, Thomas Frank  
deRenzy, Edward A.  
Ensign, Tracy  
Freeman, Dennis K.  
Garfield, Stephen Aikens  
Hulet, Gary Ray  
King, Douglas R.  
Lewis, Wayne Clark  
Mayer, Neal L.  
Montgomery, Kent Melvin  
Morrell, Steven Alan  
Niu, Harvey W.  
Rencher, Meadena Jill Harker  
Robinson, Allen Conrad  
Robison, Denis mark  
Romito, A. Scott  
Schiess, Kathryn R.  
Stephens, David Allen  
Stine, Brian Lyle  
Thorley, Steven R.  
Thurber, Mark J.  
Winkler, Andrew Max  
Wood, Jacqueline Smith  

**M. A. (1)**  
Crowther, Steven B.  

**M. S. (1)**  
Barker, Brent A.  

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**April 1980**  
**B. A. (3)**  
Bills, Sheryl Marie  
Fawson, Philip Clifford  
Golding, Karl Marlin  

**B. S. (11)**  
Bartholomew, Robert Lawrence  
Davis, Eric Taylor  
Johnson, Randall E.  
Major, Robert Drew  
McConnell, Curtis W.  
Munyan, Jelean Humpherys  
Richardson, Brian John  
Thurber, Mark J.  
Tindall, Steven V.  
Ward, David Pratt  
Wells, Brian S.  

**August 1980**  
**B. A. (5)**  
Baker, Betty-Lu  
Christensen, Bart Rex  
Larsen, Scott William  
McEwen, Mary Rawson  
Struiksma, Michael Dennis  

**B. S. (11)**  
Adams, Lynn Larsen  
Evenson, mark W.  
Hansen, Brian Keith  
Howes, James Burr  
Leavitt, Kim Nelson  
McGhie, Brian Burnell  
Moffett, Calvin Gary  
Moffett, Rodger Alan  
Richardson, Brian John  
Stockett, Zack T.  
Williams, Steven Ray  

**M. S. (2)**  
Romito, A. Scott  
Roundy, Robin Otho  

**December 1980**  
**B. A. (3)**  
Jenkins, Ellen  
Rigby, Colleen  
Walker, Shauna Marie Holbrook  

**B. S. (1)**  
Harding, Keith Donald  

**M. S. (1)**  
Frodsham, R. Tim  

**April 1981**  
**B. A. (5)**  
Carr, Joan Elizabeth  
Gittins, Larry Lane  
Thorpe, Edgar Blair  
Torres, Terri Lynn Burdette
Walters, Julie Ann Snelson  
B. S. (8)  
Burchfield, Michael Charles  
Cook, David Alan  
Eaves, Laura Elizabeth  
Jenkins, Donald LeRoy, Jr.  
Lauret, James Albert  
Munyan, Jelean Humpherys  
Terrazas, Michael Stephen  
Wells, Brian S.  
M. S. (1)  
Mayer, Neal L.

August 1981  
B. A. (3)  
Bennett, Cory Randall  
Sperry, Annette Snow  
Stephenson, Jill  
B. S. (14)  
Anderson, David Brent  
Archibald, James K  
Barnhardt, Emma Lucia  
Black, Cheryl M.  
Collins, Dale H.  
Hays, Jeffrey Brian  
Kellar, Gregory Michael  
Leany, Kevin Bert  
MacDonald, Paul Stuart  
Morrise, Matthew C.  
Perkins, Steven Blaine  
Stout, W. Bryan  
Vogelsberg, Robert  
Wilson, Terrence Edwin  
M. A. (2)  
Hatch, David N.  
Tschanz, Pamela Michelle

December 1981  
B. A. (4)  
Andrews, Karen  
O’Brien, Kathy Lyn  
Otis, David Scott  
Scoville, Claudia Jean  
B. S. (2)  
Thelin, Stephen Murray  
Turley, Deon Staffanson

April 1982  
B. A. (6)  
Haycock, Michelle  
Hoggan, Merianne  
James, Susan Naomi  
Jones, Craig Leroy  
Kemp, Beth Joyce Ludlow  
Thacker, Brandon “K”  
B. S. (11)  
Arnold, Michael Henry  
Arnold, Patricia Anne

Finch, Jeanine  
Frandsen, Marvin Vaun  
Hudson, Michael Ray  
Hugh, Patsy Yau  
Hunsaker, Nathan Lloyd  
Lee, Jeffrey Marc  
Mathews, Susan Marie  
Rodgers, Jeffrey J.  
Taylor, Michael DeMar  
M. S. (1)  
Nelson, Fred M.

August 1982  
B. A. (5)  
Chugg, Debra  
Forsberg, R Andrew  
Johnson, Bryant W.  
Mullins, Wendy  
Wilson, Melvin Richard  
B. S. (4)  
Adamson, Michael D.  
Brim, Greg Martin  
Edwards, John Mason II  
Yee, Manao Choyoi  
M. S. (1)  
Jensen, Delos Clark, Jr.

December 1982  
B. A. (6)  
Bruton, Cynthia Ann Jones  
Carr, Joan Elizabeth  
Johnson, Jan Rovetti  
Kelley, Michelle  
McDonald, Lydia D’Ann  
Paton, Robert James  
B. S. (1)  
Nilsen, Lorrain Rowley  
M. A. (1)  
Niumeitolu, Litia M.  
M. S. (1)  
Eldredge, H. Bradley

April 1983  
B. A. (1)  
Tree, Donna Rae Jackson  
B. S. (9)  
Brewer, David Grady  
Brown, Alan Edwards  
Call, Steven Max  
Christensen, Scott Alan  
Jensen, Robyn L. Savage  
LeCheminant, Renée Carr  
Lee, Douglas Mark  
Lee, Wayne Y.  
McDaniel, Marlin Neal

August 1983  
B. A. (7)
Adams, Lorraine VanderToolen
Bowman, Charie Lee Delhotal
Clemens, Monica “J”
Cook, Daniel Matthias
Hill, Diane Skillicorn
Johnson, Karl Suzannae
Swensen, Annette

B. S. (13)
Andrus, Ronald D
Barnett, Denise Dalton
Choy, Siu Hung
Christensen, Scott Alan
Drake, David Ladd
Erickson, Roy William
Johnson, Don Scott
McKinnon, Bradley Kempton
Mundell, Dan Beebe
Pace, Shawna Moser
Poole, Keith Sterling
Sanders, Craig Raymond
Watanabe, Azusa T.

M. A. (1)
Francis, Leslee Gae

M. S. (3)
Evenson, Mark W.
Throolin, Harold G.
Williams, Steven Ray

December 1983
B. A. (3)
Christensen, LeeAnn Kay Dill
Oakeson, David Wayne
Smith, Kristine Scoville

B. S. (5)
Kersh, Douglas William
Liberatore, Stephen James
McEwan, Glen Richard
Roberts, Mark Everrett
Sanders, Kristine Newbold

M. S. (1)
Kellar, Gregory Michael

April 1984
B. A. (6)
Belt, Penny Walker
Hanna, Cynthia Patricia
Hoopes, Heidi
Moffat, Meredith Ann
Montgomery, Tamara Jo
Peterson, Sheri Lynn

B. S. (15)
Adams, Jeffrey Penrod
Buechele, Dale Charles
Gingrich, Harold Scott
Hancock, Donald C
Hapeman, David Earl
Hatch, Tine Rene
Hyatt, Martin Henry
Jeans, Michelle Elaine
Johnson, Sheri Lynn
Morrill, Sandra
Schooff, Richard Maury
Snow, Tania Lee
Stapp, John Milo
Watanabe, Masasue
Yamauchi, Kazuo

M. A. (1)
Va’ivaka, Molitika Paongo

August 1984
B. A. (9)
Benedict, Benjamin Showerman, Jr.
Flower, Linda Lee Hurmence
Gleason, Sherilyn Larson
Huff, Kari Tuomisto
McNeil, Eric Lee
Mullins, Wendy
Stanger, Kevin E.
Stevens, Christina Demery
Tasso, Margaret

B. S. (17)
Anderson, Richard Edgar
Baird, Daron Oral
Brinkerhoff, Delroy A.
Cooper, Craig Allen
Fults, Jared Cole
Jennings, Johnny K.
Judy, Kathleen Decker
Lambert, Leigh
Lawler, Gary Reid
Meldrum, Richard Leon
Nelson, Reed A.
Owen, Patricia
Peterson, Scott J.
Roach, Jay Alan
Smith, Larry Kay
Tsunoda, Hiroshi
Wallman, Peter Caswell

M. S. (1)
Christensen, Reona M.

December 1984
B. A. (5)
Donna Lee Larsen Carling
Douglas John Duncan
Jennifer Hicks
Ming-Shin Chen Lee
Val Thomas Olds

B. S. (5)
Eric Robert Ashby
Jeanette Elaine Myers
Mark Joel Nielson
Jae Keun Song
Michael DeMar Taylor

M. A. (1)
Scott Jay Hendrickson
M. S. (1)
Matthew C. Morrise

April 1985
B. A. (11)
Kari Arnoldson
Kyleen Joyce Carl
Lori Lynn McLeod Croshaw
Bruce H Davies
Karen Farr
Jill April Davis Griffey
Kenneth Wayne Herlin
Teri Wineefer Horsley
Phillip D. Johnson
Teresa Ann Rounds
Marla Rae Ireland Smith

B. S. (13)
Wayne Edward Aitken
David A. Berry
James Fred Clark
Thomas Dean Coatney
Allyn W. Dustan
Todd Dickson Groesbeck
David J. Gulbransen
Michael Gary Haddock
Barry Lee Howell
Cyle Bryan Iverson
Toni Kristine Jensen
Jill Valerie Jones
David Staley Wade

August 1985
B. A. (11)
Jacqueline S. Briggs
Leon Joseph Kennedy
Ronald James Kueser
Marianne Bergeson Leavitt
Debra Joan McEviers
Karen M. Lee McKimmon
Julie Neeleman Millard
Ruth Ann Peterson
Calvin William Pierce
Michael Clair Stevens
Michael Warren Yocom
B. S. (9)
Daniel Knight Allen
Edward Ernest Allen
John Charles Buffington
Dennis H. Leonard
Lorin Michael Lund
Matthew W Orton
Perry F Pardoe
Shelley Dawn McGee Tingey
Patsy Yau
M. S. (2)
Robert Lawrence Bartholomew
Mark J. Nielsen

December 1985
B. A. (9)
Kyleen Joyce Carl
Lori Lynn McLeod Croshaw
Joyce Bushman Lyon
Michael William McKinley
Nancy G Montgomery
Standley Oneil Newton
Sonja Rae Porter
Curtis Bruce Smith
Vivian Ruth Tuft

B. S. (10)
Mark Allen Clawson
Diana Criddle Coatney
Leon Keith Francis
Amy D. Hazzard
Brent DeRay Hugh
Lance P. King
Leighton Francis Koehler
Elizabeth Ann Newman
Deffie Lynn Roberts
Kazuyo Tamura
M. S. (1)
Margaret Hill Nielson

April 1986
B. A. (12)
Michael R. Baldwin
Michael John Dorff
Michael Jones Ellett
Kelly Shane Goodwin
Sheri Ann Hutchinson
Klark Hall Kelemen
Joan T Kohler
Jo Ann Larsen
Mitchell D. Maughan
Barbara Jo Ryting
Gerald Jean-Marc Scarzella
Kris Welker
B. S. (13)
Jennifer Gappmayer Beckstrand
Daniel Lee Bennett
James Robert Davis
Christopher Prince Grand
John A. Grenawalt
Timothy L. Heaton
Kelly F. Lent
Steven K Neish
Van Arthur Newby
David S. Quimette
Dan Bingham Pitcher
Nathan Ray Soderborg
Gregory Stephen Voisin

August 1986
B. A. (14)
Richard Lee Barnes
Timothy K. Bond
Rebecca Gale
Terry Harward
Jennifer Jean Pedersen Hooper
Lynda Kay Kleinman
Kathleen Jeannette Mueller
Janet Sevy Patterson
Kim Joel Pearce
Craig Douglas Seegmiller
Wayne John Smith
Steven Keith Stewart
Richard David Thomas
Micah David Wheatley

B. S. (20)
Kevin J. Bentley
Kevin John Black
Bruce W. Cardwell
Simin Mohammad-Pour Daryace
Scott Robert Fletcher
Raymond T. Goodson
Blake Douglas Hamilton
Jerry A. Hamilton
Thomas Joe Hampton
Daris William Howard
Anthony Wade Howell
Ali (Reza, Farhang) Fesharaki Ja’fari
Nan Allison Jones Lemmon
Chris Lyman Morin
Wei Xiang (Kaelene) Peng
Joe Miles Simons
Roy P. Sookhoo
Theodore Barney Stanford
Steven Boyce White
Stacey Sakae Yoshimoto

M. S. (1)
Kazuo Yamauchi

December 1986
B. A. (8)
Michelle Thayne Ashcraft
Sandra McKinnie Diehl
Lori Ann Crawford
Anne Crawley Crosland
Allan Lee Habedank
Janet Rose Melton
Michelle Moessner Pfister
Richard David Thomas

B. S. (8)
Lynette Lindstrom Allsop
Dann T Barnes
Winona Fay Pope Black
Brett Duane Hodgson
Paul Kyger Holland
Susan Rosemary Irvin
Tae Ryong Lee
Larry Allen Loefgreen

April 1987
B. A. (11)
Lori Ann Adams
Kathleen Ann Berrigan
Kyle Mark Canty
Shauna Kay Smith Carr
William Patrick Grayson
Renee Roy Greene
Linda Marie Hansen
Jocelyn Nielsen
Kelly Anne Remund
JoAnn Rhodes
Kathleen Lynn Richmond

B. S. (14)
Mark Aaron Abramson
Michael Paul Abramson
John Berglund Armknecht
Kent Allen Bessey
Paul Edwin Carey
Christopher John Chase
Anne Blair Cridle
LeVoy Golden Haight
Jennifer Olcott
D. Kirk Reese
Julie Ann Reeve
Catherine Marie Sager
Paul Howard Shawcroft
John David Wendel

August 1987
B. A. (12)
Melanee Ren Billings
Tiffany Thorpe Black
Lisa Anne Dain
Betsy Ann Dalley
Diane Davies
Kristen Payne Dee
Laura LaRee Jackson
Edith Mae Jones
Ronald Kay King
Linda Louise Ludlow
Cynthia Jean Lund
Eldon Von Palmer

B. S. (10)
Susan Lynne Barney
Jeanine Hansen Bentz
Laurel T. Fearnley
David Bartlett Fonda
Stuart Blake Fordham
Steven I Low
Kevin J. Lund
Troy James Pritchett
Marc Alan Smith
Amy Suzanne Whitman

M. S. (3)
Marty Steven Daybell
Lorin Michael Lund
David Scott Ouimette
December 1987
B. A.
Lora Lee Day
Nancy R. Gates
Wendi MacLean Karbakhsh
Denise Kay Taggart
Jonathan S. Webber
Maria Antonieta Yazzie
B. S. (8)
Christine Del Prete
David Bartlett Fonda
Mary Ellen Furner
David Luke Gill
Craig Terry Harmer
Kate Michaelis
Zonda Doré Schaffer
Eric Lewis Swenson

April 1988
B. A. (13)
Kelli Jean Bonham
Media Ann Thomas Burton
Sharilyn Piilani Fong
Lorraine Jones Hanson
Cara Louise Johnson
Steven Kent Lyon
Delia Rae Madsen
April Rae Mikami
Janene Rigby Petersen
Matthew N. Pierce
Shelly Lynne Summerhays Savage
Kathryn Briggs Van Wagoner
Linda Jean Walker
B. S. (14)
Lou LaGrange Burton III
Bradley Evan Garner
Carolyn Ruth Cook Hamilton
Janice Harris
Kurt Lawrence Harrison
Lisa Ann Jensen
John Doran Kenney
Young Yong Kim
Troy James Pritchett
Deana June Richmond
Brian Robert Scott
David M Spencer
Millie Jean Westley
Shellee H Wiedemeier
M. S. (1)
Laurel Tamara Fearnley

August 1988
B. A. (17)
Thomas LeRoy Behunin
Connie Lyn Colvin
Melinda Taylor Garff
Sheri Diane Gray
Scott Tyler Johnson
Russell Brent King
Melinda Sue Kleinman
Teri Lynne Lewis
Terri Matthews
Timo A. Mostert
Lori Ann Price
Jeffrey A Strong
Janet May Sutorius
Janet Guymon Walter
Tana Jo Wilson
Eenja Yoon
Karen Lee Mason Zaharis
B. S. (4)
Paul Franklin Cox
Clifford W Hansen
Lochlin A MacLeod
Todd K. Moon
M. S. (4)
David Carlos Adams
Hazel Jean McKenna
Jan Marie Pfeifer
Royce Stewart Shelley

December 1988
B. A. (7)
JaLynne Blackner
Nancy Ann Bradshaw
Ivan I. Clarke
Darren Scott Mealy
Monique B. Michel
Gwendolen Andrews Sedillo
Jennifer Maile Waite
B. S. (8)
Susan Lynne Barney
Stephen T. Black II
Lyman Douglas Edwards
Melanie Taylor Huff
Lori Ann Malmrose
Julia Rei Mori
Grant W. Quinlan
Ian K Winters
M. A. (1)
Melvin Richard Wilson
M. S. (1)
Christopher P. Grant

April 1989
B. A. (13)
Sharon Christensen
Trina Kristine Davis
Judy Kaye Guinn
Mary Robin Herndon
Christine Ingles
Marie Lemon
Randall Stephen Lomas
Samantha Eastman Moore
Stephanie Neilson
Alene A Rasmussen
David Reed Tanner
Lori Annette Oviatt Thomas
Ellen Sanders Zaifnajad
**B. S. (10)**
Christian Brent Butterfield
Scott Cromar
Jeffrey L. Fletcher
Charles R. Grilliot
Zahra Hashemi
Bradford W. Larsen
Ryoki Machida
Deborah Lynn Mayer
Diane Parker
Daniel K. Siebert
**M. S. (2)**
Michael Paul Abramson
James Nicholas Burgess Gartside

**August 1989**

**B. A. (13)**
Donald Duane Busenbark
Suzanne Stirling Cook
Bih-Shya Hwang Croft
Lisa Anne Dain Dean
Teens Lyn Grisenti
Mary Robin Herndon
Suzanne Layne McAllister
Lauri Richelle Nelson
Effie Jo Anne Okeson
Julia Marie Porter
Cameron Arthur Smith
Randy G Tree
Jeith Lee Wilson

**B. S. (10)**
Matthew Thomas Allen
Shane Thadeous Bringhurst
David Lawrence Carlson
Denise Marie Halverson
Terrance C. Hedding, II
Tyler J. Jarvis
Fung Lin (Annie) Lai
John William Philip Ramsey
Karen Corey White
Wendy Kaye Wilson

**M. A. (1)**
Jong S. Hwang

**M. S. (5)**
Kent Allen Bessey
Jennifer Oclott Glines
Brent DeRay Hugh
Robert N. Ream
Joe Miles Simons

**December 1989**

**B. A. (3)**
Beth Ann Hansen
Laura Lyn Howell

**Shanon Diane Davies Kreuger**

**B. S. (4)**
Maree Lyn Berry
Kenichiro Chinen
John J Lund
Beverly Jean Morrell

**M. S. (1)**
Kate Michaelis Nielsen

**April 1990**

**B. A. (12)**
John Avon Stoll Bateman
Tamara Anne Black
Robert Duane Brown
LeAnne Davis
Michelle Ann Schuelke Eckery
Deborah Scheib Hart
Lori Loveridge Parr
Scott Randall Rippy
Loni Ann Saatkamp
Melissa Ann Stuy
Marsia M. VandenBos
Deena Rae Wood

**B. S. (9)**
Gregory Lynn Adams
Seth Gerald Armstrong
Bradley Dee Canfield
Carrie Jaussi Garner
Conrad Lanny Gerber
Tina Renee Holding
Mark Robertson Lent
Michelle Diane McCown
Lance Delbert Ward

**August 1990**

**B. A. (12)**
Bennion, Inger Catherine
Bogdan, Aileen Joyce
Crandall, Alisa Page
Jones, William Robert
Lewis, Jennifer Lynn
Markham, Stephen Jay
Martinez, Carmen D.
Rockwood, Jill Forbes
Rocque, Rebecca Hamedew
Seely, Merrily Ann Johnson
Solomon, Wendy Ann Jakins
Watkins, Christina Cook

**B. S. (11)**
Dowdle, Julie Kay
Duffin, Kirk L.
Erickson, Jonathan James
Jensen, Mi Soon Hong
Jones, Elizabeth
Kevin F. Kingborn
Paxton, Victoria Lynn
Pelland, Todd Edward
Kenneth Eugene Scott  
Tripp, Allyson  
Waite, Duane Rendol  
M. A. (1)  
Van Orman, Helen Elizabeth Gardner  
M. S. (2)  
Jarvis, Tyler J.  
Westley, Millie Jean Hansen  

December 1990  
B. A. (12)  
Crandall, Rachel Ann  
da Rosa, Lisa Anne  
Halcomb, Kerri  
Lamb, Genette  
McAllister, Suzanne Layne  
McKell, RaShel Anderson  
McKrola, Michael Lynn  
Memmott, Janalee Brown  
Royal, Rhonda Renee  
Smith, Lynae Del  
Thompson, Teresa Ann  
Zobell, Eric Jensen  
B. S. (7)  
Cardon, David Alan  
Coombs, Kristine Marie Parkin  
Hancock-Fisher, Christine  
Kinghorn, Kevin F.  
Kristjanson, Dana Lynn  
Schone, Patrick John  
Tweed, William Allen  
M. S. (1)  
Zhang, Ping  

April 1991  
B. A. (17)  
Anderson, Deborah  
Andrews, Christine Lynn  
Barnum, Rebecca Ann  
Bennion, Sheryl Ann  
Bingham, Kama  
Christopherson, Lorraine Louise  
Drake, Leston D.  
Duffin, Patricia Call  
Etcher, Dena Kesler  
Neubert, Lisa Gay  
Pack, Miriam  
Richey, Innette  
Strong, Kathleen  
Tree, Ellen Jane  
Walton, Aaron Ase  
Ward, Robyn Tolman  
White, Laurel Forsyth  
B. S. (17)  
Blanchard, Carol McCurdy  
Dean, Matthew Lee Youle  
Dean, Samuel Paul  
Ferguson, Samuel L. P.  

Haroldsen, Ancel Jason  
Lewis, Scott Calvin  
Malstrom, Beverly Ann  
Nuzman, Julianne September  
O’Hara, L. Michele  
Oliphant, William G.  
Schwartz, David A.  
Scott, Kenneth Eugene  
Short, Anne Marie  
Smith, Daryl T.  
Smith, Sabrina Dawn  
Stevens, Shawn Marie  
Wunderlich, Philip Swainston  
M.A. (1)  
Kaluihiokalani, Manaoo Choyoi  
M. S. (2)  
Newman, Elizabeth Ann  
Pierce, Matthew Nicholson  

August 1991  
B. A. (15)  
Corbett, Sarah Anne  
Draney, David S II  
Durrant, Kristen Hatch  
Etcher, Dena Kesler  
Fisher, Rachel J.  
Ganowsky, Jennifer Kim Rosskopf  
Harris, Pamela Weber  
Hollist, Linda Sue  
Hoskins, Analisa Bell  
Rasmussen, Randall John  
Riley, Cynthia Spencer  
Sheridan, Shauna White  
Sullivan, Carole Bunnell  
Walkup, Denice Lea  
Whitaker, Erin K.  
B. S. (13)  
Boss, Michelle Annette  
Fitzpatrick, Diane Lee  
Floyd, Jennifer Kathleen  
Gardiner, Kevin Robert  
Huang, Ray  
Morrow, Brian Duff  
Norton, Lisa Kay  
Rackliffe, Vincent Brian  
Smith, David LeGrande  
Sonnefeld, Fredrick Llewellyn  
Teemant, Merrill  
Wagner, Elaine Rumsey  
Wood, Robert Lee  
M. A. (16)  
Adams, Lorraine Vander  
Biggs, Barbara Lynn  
Bird, Elsie L. Rice  
Caviness, Chris Alan  
Clarke, Ivan L.  
Day, J. Rodney  
Hales, Karl D.  

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Hansen, Donald Gene
Johnson, Karil S.
Kanno, Roy Stephen
Ostler, Brian Harold
Taylor, Karen C.
Thomas, Lori A. Oviatt
Walker, Christine I.
Yocom, Michael Warren
Young, Mary H.
M. S. (1)
Carlson, David L.

December 1991
B. A. (13)
Shelley Goodman,
Sherri Ann Pack,
Della Pilgrim,
Dorie Jo Porter,
Amanda Dove Richardson,
Janilyn Jenson Sainsbury,
Ember Eskelson Storrs,
Timothy Dean Buckner,
Mark Edward Lyon,
A. David McKinnon,
Tiarerangi Renee Stone,
David Albert Taylor,
Michael Travis Taysom.
M. S. (2)
Sheri L. John Anderson,
Patrick John Schone.

April 1992
B. A. (22)
Jean Porter Bagley,
Michelle Rae Bagley,
Jennifer Eldredge Barrick,
Deborah Boren,
Kenneth Vernon Cahoon,
Merrilee Moesser Davis,
Jonelle Marie Denison,
Timothy Allen Dolbin,
Lacey Lei Edwards,
Jesse Frank Fisher,
Leah E. Hoschouer,
Kimberly Ann Knight,
Lisa Annette McCabe,
Nancy Lynn Millhone,
Mariah Ellen Pyle,
Candice J. Ramberg,
Heather R. Robison,
Rebecca Homedew Rocque,
Stephanie Stone,
Melanie Poelman Thompson,
Dell DuShane Williams,
Nancy J. Wolfe.
B. S. (19)
Christopher Robert Abramson,
Candace Adamson,
Lynne Brockbank,
Darrin Matthew Doud,
Julie Ferguson,
Carol Louise Harner,
Michael Raymond Hamilton,
Jan L. Humpherys,
Carol Gammon Jensen,
Nathan Layne Kleinman,
Brian Keith McBee,
Jan McDonald,
John Walton Millard,
Faith Ann Morrell,
Wayne Stanton Porter,
Kimberly M. Rackharn,
Eric Karl Ringger,
Andrew Perry Shull,
David Stewart Udall.
M. S. (4)
Seth Gerald Armstrong.
Bruce W. Cardwell
Elizabeth Jones,
Julie Dowdle Thompson.

August 1992
B. A. (18)
Aagard, Julie Lewis
Amidon, Rebecca Kay
Cahoon, Kenneth Vernon
Carleton, Lee Newton
Duncan, Janet Alldredge
Edwards, Lacey Lei
Goold, Jeanine Patricia
Groharing, Cheryl Peterson
Kassner, Todd Norman
Larsen, Shawnell Simpson
Martin, Shannon Cassidy
Maxwell, Kristen Renise
McCabe, Lisa Annette
Pearson, Natalie Etta
Price, Jeffrey Grant
Stoddard, Jared Evan
Weiler, Colleen
Winsor, Stacy Kay
B. S. (12)
Asplund, Matthew Charles
Hyatt, William Joseph
Ibbertson, Bryant V.
Jones, Sterling B.
Libi Libi, Eliezer P.
Mok, Man-Kam
Morgan, Mary Kathryn
Plewe, Brandon Stanley
Shull, Andrew Perry
Strong, David Moroni
Twede, Darren J.
Wilson, Frank Carter
M. A. (2)
Backus, Ellen Jenkins
Wood, Deena Rae  
**M. S. (2)**  
Brown, David Ellis  
Ward, Lance Delbert

**December 1992**  
**B. A. (10)**  
Julia Ann Titsworth Emms  
Sandra Gold  
Cheryl Peterson Groharing  
Shawnell Simpson Larsen  
Rebecca Reynolds Lyman  
Marny Kai Parkin  
Wade Jay Petersenl  
Jeffrey Grant Price  
Christi Ann Reed  
Pamela Dean Ricks  
**B. S. (9)**  
Shawn Daniel Brown  
Reynold Elias Byers  
Jeanette Davis Groll  
Laurel Bastion Heil  
Gary Michael Lewis  
David Stewart Udall  
Neil Anthonyt Waite  
Andrea Young  
Stacy Gyllenskog Young  
**M. S. (1)**  
“Mohammed Othman” Nash’at Omran

**April 1993**  
**B. A. (19)**  
Melody Anne Apezteguia  
Olga M. Armita  
James Edward Ashton  
Valerie J. Blankenship  
Angela Kaye Doyle  
Marie H. Dustin  
Lisa Calleen Findlay  
James Raymond Heintz  
Heather Anne Hill  
Kathleen Denise Johnson  
Amy Ilene Scott Larsen  
Kimberly Dawn Love  
Elizabeth Faye Richardson  
Michele Irene Richardson  
Jennie Elisabeth Ritchie  
Sharolyyn Wright Starrs  
Tonia Landon Swallberg  
Gia Beth Thorpe  
Jennerder Wilson  
**B. S. (16)**  
Paul Thomas Belue  
David Shane Brewer  
Ramon Jose Abad Brobio  
Waldon Rollin Burr  
Brandon J. Campbell  
Michael James Cannon  
Jennifer Durham  
Todd William Easton  
Frank Jaromir Fuchs  
Julianne Scott Grundvig  
Melissa Kemmerle  
Jay Edmund McDougal  
Gerald Patrick Pierce  
Clair Jay Prichett  
Eric Dwain Stemmons  
Tara Danielle Vance  
**M. A. (1)**  
Beth Ann Gowans  
**M. S. (4)**  
Troy Larry Goodsell  
Jie Liu  
Deana June Thornock Richmond  
Robert L. Wood  
**Ph. D. (2)**  
Eric L. Swenson  
Jian Ping Xun

**August 1993**  
**B. A. (10)**  
Amy Nicole Andrus  
Michelle Lynette Peterson Brady  
Johanna Erl Brown  
Branton J. Campbell  
Tiffany Gardner Carley  
Michael Robert Cox  
Leslie Jean Evans  
Shawn Scott Ledingham  
Robert Todd Reimer  
Tamara Lee Wall  
**B. S. (16)**  
Kathryn Ann Andrist  
Colin J. Brinkerhoff  
Brett Barlow Burrows  
Jared Brough Dorny  
Lance Earl Farmer  
Wendy Grow Ford  
Bryan Edward Harker  
Lynette Hatch  
Paul Thomas Johanson  
Lori Kalt  
Melissa Kemmerle  
Jay Edmund McDougal  
Marlene Erikson Parkinson  
Jeffrey Scott Pinkston  
John Wesley Robertson  
Nina Marie Welker  
**M. A. (1)**  
Rachelle Cottle Ludwinski  
**M. S. (4)**  
Scott Calvin Lewis  
Daniel Kevin Siebert  
David LeGrande Smith  
Ximing Zhou
December 1993
B. A. (13)
Tawnya Grover Bearss
Racquel Lynn Blake
Mary Elizabeth Christensen
Blaine George Edman
Randy Mackey Green
StevenJamiolekowski
Ana Lisa DeLong Jenkins
Allison Payne Johnson
Julie Roberts Saunders
Chirstine Lina Brunner Tucker
Juliana VanSlooten
Tuan-I Weng
Julie Rae Wermes
B. S. (13)
Jeffrey Ray Bowes
Kimberly Elcock Brown
Nolita Wai Chi Chow
Dwayne Leron Gardner
Laura Leigh Housley
Sean Mervin Housley
David Larry Hunter
Tatsuya Kawasaki
Cecilia Mui-Fong Lok
Man-Kam Mok
John Wesley Robertson
Karl Foster Warnick
Sheri Elizabeth Yandle
M. S. Thesis (1)
Qing Chang

April 1994
B. A. (26)
Kimberlee Clark Arnold
Jocie Lynel Anderson
Laura Andrews
Stacie S Briggs
Lauri Palmer Canales
Jennifer Louise Kiehl Clark
Katherine Rebecca Dove
Brenda Lynn Erath
Michael Jay Eschenberg
Clorinda Agatha Gatrell
John Nathan Gillett
Tona Graff
Rhonda Lynn Leilani Griffin
Jennifer Janet Huffaker
Laura Jean Jeffery Johnson
Kathy Kidder
Noelle Keodalani Makakoa
Mary Lynne Michaud
Alyson Barney Rummler
Amy Kerchinsky Treanor
David W Waite
Douglas Call Walker
Rebecca Joan Waters
Stephanie Whitehair
Matthew Shumway Winsor
Scott Lawrence Yetter
B. S. (25)
Justin Crayton Birrell
Alexander Scott Bradley
Frank H. Bria
Dennis J Carney, Jr.
Edward Wayne Clark
John Snyder Colton
Nathan F. Doubleday
Joel Brent Fernelius
Laura Michelle Fisher
Carl Robert Gibbons
Evica Koljanin
Emi Lynn Larsen
William James Layton
Karna Maughan
Rui Young Maximo
Tracy S. Montierth
Rebecca Ann Paulsen
Jason Todd Poffenberger
Douglas Alan Rosenquist
Kyle Donald Scott
Anthony Dale Smith
Lynell D Smith
Stephanie A Walker
Nina Marie Welker
Andrew C Zmolek
M. A. Thesis (1)
Rodvern TeWhiti Love Lowry
M. A. Non-Thesis (2)
Brian D. Morrow
David Paul Goldberg Westwood
M. S. Thesis (3)
Reynold Elias Byers
Xinyu Deng
Neil Anthony Waite
M. S. Non-Thesis (4)
David James Huff
William Joseph Hyatt
Jan Lyn Pitts
Frank Carter Wilson

August 1994
B. A. (18)
Carol Lynne Angle
Vicki Horrocks Arnold
Connie Genan Atkisson
Shelley L. Banfield
Kathryn Klemetson Bekker
Christopher Todd Boettcher
Jeanette Allen Jacobs
Jolynne Knight Jiménez
Brian J. Kerr
Marla Jean Lance
Mikal Lee Lythgoe
Diane Heywood Moberly
Lynette Mihoko Muranaka
Sarah Ruth Pixton Slade
Jennifer Christensen Stanley
Julie L. Bowen-Thwaits
Jennifer Stone Whipple
Heather Ann Wilson
B. S. (15)
Jeffrey Scott Anderson
Keri Lynn McEntire Anderson
Mark Roscoe Ashurst-McGee
Susan Renée Aydelotte
Hylie T. Barton
Darin Baur Brimhall
Paul Marshall Cardon II
Fu-Chih Cheng
Brett John Davis
David Lawrence Fearnley
Collette Davis Hilt
Norman C. Jarvis
Steven Michael Komm
Kipp J Orton
Melinda Weston Ostraff
M. A. Non-Thesis (3)
Tana Jo Beckstrand
Ross Charles Decker
Paul Beaubeaux Mills
M. S. Non-Thesis (5)
Thomas Gribovski
Denise Marie Halverson
Darrell Gordon Johnson
Jan Lyn Pitts
Andrew Perry Shull
Ph. D. (2)
Eric M. Freden
Paul Howard Shawcroft

December 1994
B. A. (9)
Carol Lynne Angle
Lauri Palmer Canales
Ramón Basil Cano
Lori Lynn Cardon
Robert Douglas Farnsworth
Geri Anne Larimer
Laura Renee O’Neal
Dawn Teuscher
Jennifer Suzanne Young
B. S. (4)
Lucinda Maughan Armstrong
Katherine Sneddon
Susan Elizabeth Parkin
Daniel Ephraim Shuman

April 1995
B. A. (41)
Burgundi Acord,
Vonae Michelle Adams,
Jean Alldredge,
Tamigene Anderson,
Melanie Dawn Barclay,
Loree Lee Barker,
Britney Kay Barlow,
Tina Michele Chappell,
Kevin Ray Chase,
Coburn Dow Christenson,
Todd S. Coley,
Rodger Matthew Dohrn,
Lori Ann Emery,
Lara Cheryl Freebairn Hale,
Gregory Mark Hemenway,
Amy Burton Holt,
Angela Humble,
Joanna Jean Johnson,
Jill Clark Jones,
Jill Joost,
Michele Fellows Lewis,
Nikki C. Lines,
Nephi Allan Noble,
Amy Christine O’Farrell,
Jamela Van Wagoner Pace,
Carol Ann Pestana,
Deirdre Wynn Whitehead Plaster,
Debra Denninghoff Richardson,
Malinda Dee Lloyd Severn,
Stacey May Shaw,
Allen Royal Skidmore,
Marci Almond Smith,
Heather Elaine Sorensen,
Sharon Ruth Staffanson,
Tawnya Joy Stucki,
Marthea Lynann Tlustek,
David Dana Walters,
Krista Marie Watts,
Jennifer Marie Koch Westfall,
Sarah Alane Morse Weston,
Tiffany Lynne Zick.
B. S. (18)
Clark Wayne Barrett,
Mark Cheiron Butler,
Scot Elliot Campbell,
Russel Otto Carlson,
Christopher Blair Crawford,
Craig David Hutchings,
Christopher Bain Koller,
Suhui Sophie Huang Li,
Kaylene Majeske,
Lauri Huber McMullan,
Kiyoko Nakayarna,
Carin Angela Price,
Kelly Lynne Smith,
Stephen Will Tanner,
Blake Thornton,
Robert Terry Tomlinson,
Melvyn R. Windham, Jr.,
Lance Richard Wood.
M. A. (2)
Susan R. Irvin Fredette,  
Candace Jean Osgood Wignall. 
**M. S. (4)**  
David Shane Brewer,  
Paul Thomas Johanson,  
Jay Edmund McDougal,  
Eric Dwain Stemmons.  
**Ph. D. (1)**  
S. Blake Fordham.  

**August 1995**  
**B. A. (30)**  
Ruth Ann Acor,  
Launa Fowles Buxton,  
Kevin Ray Chase,  
Marie Condie,  
Sherry-Anne Cottrell,  
Kimberly Ladd Duffield,  
Melissa Dunford,  
Thomas L. Hansen,  
Amy Burton Holt,  
Leslie Kaye Householder,  
James O. Jacobs,  
John David Jensen,  
Julean Jensen,  
Shawn Dee McLeod,  
Deanna Lee Purdy,  
Stacy Loraine Reynolds,  
Pamela J. Rowntree,  
Nicole Neider Sargent,  
Karen Amy Schwartz,  
Malinda Dee Lloyd Severn,  
Sharon Ruth Staffanson,  
Catharine Sudholt Steele,  
Blaine Elliot Sundrud,  
Emily Baird Thompson,  
Ian Shane Wagner,  
Krista Marie Watts,  
Wendy Kay Wells,  
Kathleen Wimber,  
Heather Young,  
Anna Kay Yssel  
**B. S. (11)**  
Sheryl Anne Carty,  
Eleanor Jung-Ah Coker,  
Thor Benjamin Cummings,  
Catherine Elizabeth de Gaston,  
Marcia Anne Geertsen,  
Stuart L. Haven,  
Tamara Lee Hodge,  
Craig David Hutchings,  
Laura Davis Oldham,  
Travis Elgin Oliphant,  
Christine Patterson  
**M. A. (4)**  
Gregory C. Beveridge,  
Rachel Lea Clay,  
Wilford Mueller,  
Kenneth David Reeves  
**M. S. (10)**  
Jeffery Scott Anderson,  
Keri Lynn Anderson,  
Kathryn Ann Andrist,  
Susan Renee McFarland Aydelotte,  
Hylie T. Barton,  
Jared Brough Domy,  
William James Layton,  
Lu Pan,  
Jan McDonald Thomson,  
Thilagavathi Murugesan  

**December 1995**  
**B. A. (15)**  
Marie Aldous Barfuss,  
Bonnie Marie Burkholder,  
Carlynn Michelle Crockett,  
Melissa Dunford,  
Robert Thomas Franzowski,  
Bonnie J. Hauber,  
Amy Burton Holt,  
Elizabeth Ann Kirkby,  
Anne Marie MacDonald,  
Debbie Miner,  
Louis Oliphant,  
Nicole N. Sargent,  
Nancy Lynn Strong,  
Ian S. Wagner,  
Anna Kay Yssel.  
**B. S. (3)**  
Robert L. Anderson,  
Thomas G. Draper,  
Kristin Taylor.  

**April 1996**  
**B. A. (40)**  
Kristen Valdivieso Barclay,  
Pamela Sue Jackson Bishop,  
Leslie Anne Carson,  
Keri Junne Chartrand,  
Jennifer Jo Cluff,  
Mary Colleen Dunn,  
Gardner Durrant,  
Sharee Facer,  
Amanda Frances Gonzales,  
Jena Marie Gregory,  
Tiffany Dee Hansen,  
Brook Bowcutt Hatch,  
Tiffany Allen Hatch,  
Bonnie Jean Packer Hauber,  
Marisa Lynn Hills,  
Aaron Richard Hogge,  
Katrina Holliman,  
Iain Hunter,  
Carter Garrison Jensen,  
Susanne Kellis,

B. S. (22)

M.A. Mathematics Education (5)
Phil Johnson, Troy Jones, Nadean Nielson, Robert Nilsson, Renae Seegmiller.

M.S. (2)
David Fearnley, Faith Ann Morrell

August 1996
B. A. (23)

B. S. (11)

M. A. (2)
KimberLeigh Hadfield, Miriam Pack

M. A. Mathematics Education (18)
Clark Anderson, Wendy Bliss, Janett Borg, Ronald Dalley, Kevin Eppich, Barry Erickson, Linda Goddard, Merilyn Hedelius, Lexa Larsen, Randy Madsen, Lewis Mullins, Matt Mullins, Brent Poulsen, Karen Roper, Gino Schena, Janet Sutorius, LeRon Ware, Stacy Whitmore

M. S. (6)
Bassam Abbasi, Alex Bradley, Myong-Hee Chae,
December 1996
B. A. (16)
Kimberly Averett,
Rebecca Elaine Benson Bailey,
Margaret J. Bullock,
Carter Garrison Jensen,
Jennifer Lynn Mangum,
Tiffany B. McKinnon,
Annette Marie Muir,
Travis Clare Nelson,
Amy Rosier,
Annie Thomas Russell,
Daylyn Thompson Seaman,
Michael C. Stevens,
Aluna Marie Westover.

B. S. (5)
Calvin Lew Black,
Travis Stewart Bohon,
Benjamin Isaac Huff,
Eric Layton,
Brent Douglas Moody,
James Darrell Park,
Gregory Wayne Perkins,
Daniel T. Richards.

M. S. (3)
Susan Elizabeth Parkin Hoelzer,
Tatsuya Kawasaki,
Rui Young Maximo.

April 1997
B. A. (43)
Amy Jo Allen
Johathan David Allen
Heather Marie Bellon
Wendi Rae Biolo
Alicia Gorringle Brown
Shirleen Brunt
Christine Cannon
Sharla Cook
Kalene Jones Darling
Suene Haws Eardley
Brandi Ann Fielding
Melanie Free
Rebecca Dibb Hall
Heather Marie Hammond
Shannon Smith Henderson
Alison Henry
Lynda McSeveney Hill
Julie Hillstead
Randall Edward Jefferies
Kristen Lyn Johnson
Tracy Ann Jones
Brian Gould Larson
Jeanette Reno LeBlanc
Konda Jo Luckau
Michael Edward Matthews
Kristin Lucillia May
Benjamin Roy McClure
Alison Harris Mueller
Angela Stratford Neeley
Dana Ann Palmer
Jennifer Palmer
Amelia Marie Pearson
Robyn Staker Pew
Steven James Royce
Monte Jasen Shaffer
Stephanie Gale Short
Sara Elizabeth Wyne Smith
Ellen May Sneddon
Jessica John Soto
Heather Garr Stotts
Erin Elizabeth Stowell
Jennifer Jeannette Westman
W. David Wright II

B. S. (19)
Kirsten Corrine Gilson
Shane Nikolaus Hall
Gregory Kent Hansen
Rebecca Bennion Hart
Dennis L. Havens
Lorraine Hellewell
Daniel Micheal Howard
Vaughn Howard Hughes
Catherine A. Johnson
Khayyam Alexei Jones
Perry VerNon Lalliss
Elizabeth Hall Lambert
Ryan Chadwick Larsen
Chad Scott Lillian
Christine Marie May
Thomas Wayne Milligan
Shawn Mauritz O’Berry
Robert Theodore Pope
Randy David Smith

M. A. Thesis (1)
Tara Loraine Lewis

M. S. (1)

Cecelia Lok Weingartner

August 1997
B. A. (23)
Jonathan David Allen
Shoshauna Brown
Karalynne Joyce Callister
Clief Luis Castleton
Elizabeth Erin Crisp
Douglas Paul Finch
Jessica Jane Rex Forsgren
Arthur Alan Freeman
Lisa Ann George
Kristi Marie Gronski
Kathi Margaret Sampson Hansen
Tiffany Allen Hatch
Katherine Elizabeth Johnston
Tammy King
Jennifer Lee
Julie Ann Serna
Amy Lisa Smithson
Ronald Glen Thorpe
Many Anne Walker
Karla Ann Wasden
Traci U’Ren Williams
Rebecca Jean Wursten
T. Murray Zogg II

B. S. (5)
Nephi David Alred
Marshall Delbert Ence
Eric Pool Hintze
Kenneth L. Israelsen
Denise Grace Raynes
Brandy Faye Romer
Sytske Sjoukje Woodhouse

M. A. Thesis (5)
Clare Chyi-Ling Banks
Tina Michele Chapell
Sherry-Anne McLean
Nephi A. Noble
Karen Schwartz

M. A. Mathematics Education (1)
Dennis Winfield Dalton

M. S. Thesis (2)
Thomas G. Draper
Summer Thurston Evans

M. S. Non-Thesis (2)
Jonathan R. Lawton
Yonghong Mao

Ph. D. (3)
Troy Larry Goodsell
Mohammed “Othman” Omran
Chongchun Zeng

December 1997
B. A. (18)
Tina Winter Bledsoe
J Kevin Bower
Sharlene Wagstaff Enloe
Arthur Alan Freeman
Ian Scott GaGon
Andrea Nicole Gardner
Kathi Margaret Sampson Hansen
Patricia Kempton Kammerman
Wendy Rebecca Lee
Katherine Empey Marshall
Shelley 1 Moehle
Andrea Mumford
Laura Jean Secrist Nelson

Amy White Slagowski
Lynsey Lane Sheddon
Julie Stafford
Tabitha Noel Valencic
Kimara Kathleen Webb

B. S. (5)
Jonathan Andrew Bodrero
Page Ann Palmer Hoppe
Chad Scott Lillian
Ryszard Stanislaw Rosiak
Janessa Kathleen Tucker

M. A. Thesis (1)
Beverly Ann Malstrom Cannon

April 1998
B. A. (27)
Shelley Elaine Ashcroft
Dawn Marie Barson
Duane Emil Baumann
Kristine Shaffer Burton
Jill Cazier Cloward
Eileen Cox
Matthew Jared Davenport
Kimberly Ladd Duffield
Stacey Lynn Evers
Ruth Lloyd Fajardo
Sandra Lynn Goss
Stephen James Hall
Doris Louise Hansen
Kristin Kay Harman
Chalon Elizabeth Linton
Carmela Herrera Macias
Danielle Madsen
David Scott Miller
Natalie LaNae Hoskin Miller
Julianne D. Nelson
Paula Jeffery Prestwich
Pamela Sue Price
Delene Aldredge Seaman
Christina Cook Watkins
Carri Ann Webb
Martin Andrew Yablonsky
Kimberly Zetterquist

B. S. (18)
Jennifer Lee Aceves
Christopher David Barlow
Russell Emerson Bell
Hugh Michael Brown
Jessie R Bunting
Emily Carpenter
Aida Serrano Castelan
Todd Lowell Fisher
Spencer E Hall
Khayyam Alexei Jones
Karl William Kowallis
Wayne Ole Lasson
Jonathan Thomas Marshall
James Russell Mulnix
Brad L. Rigby
Sanderson, Stephanie
Snarr, Sara Elizabeth Broadbent
Young, April
M. A. (2)
Dolbin, Timothy
Dunn, Mary
M. S. (5)
Brinkerhoff, Colin
Kim, Vicki Herbst
Russell, David
Taylor, Kristin
Wise, Bryan

August 1998
B. A. (15)
Ashton, Traci Ann
Lacy P. Benson
Jonathan Morris Bowen
Stacey S Briggs
Brent Robert Chubbs
Genevieve Demos
Grant Allen Hanks
Jeremy Christian Hoth
Kerri Annette Jones
Kristine Alkema Lines
Malinda Dee Lloyd Severn
Elaine Elna Thalman
Metline Liolaina Tuitupou
Jose Baldemar Valdez, Jr.
Carolee Furr Vernon
B. S. (9)
Guillermo Antonio Acosta
Michael Leon Higley
Michael Sheldon Hunter
Brent Freeborn Larsen
Merrill Windous Liechty
Jeremy Franklin Magidson
Gina Ambrose Nasca Thompson
Yumi Watanabe
Randy R. White
M. A. (3)
Robert Farnsworth
Aminda Gonzales
Carole Sullivan
M. S. (3)
Kara Lynne Cook
H. Tracy Hall
Jason Haroldsom
Ph. D. (2)
Dmitri Kuksov
Junping Shi

December 1998
B. A. (11)
Kelly Shipp Andrews
Chad Benedict Asay
Jennifer Beck

Emily Dixon
Leslie Huber
Jennifer Mae Powell
Robert J. Pyne
Erin Elizabeth Rothen
Zoe Marie Schnebly
Sherry Ann Scott
Cherie Palmer Visker
B. S. (3)
Dean Hekili Oleole
Amy Sidaway Pryor
Jonathan Lance Reese
Ph. D. (1)
Andreas Weingartner

April 1999
B. A. (35)
Millie Johnson Anderson
Chelsey Alayne Belt
Elizabeth Bingham
Denise Ann Bjarnason
Sarah Elizabeth Bybee
Jessica Leigh Weenig Collyer
Haley Cherise Crahan
Laura Sue Cummings
Vari Nelson Durrant
Elizabeth Marie Hunt
Ashley Kennard Jensen
Michelle June Brown Joines
Mandy Moon Larkins
Annette Gold Mason
Neiko Marie Meryhew
Cynthia Romaine Price
Lisa Rands
Elsa Leana Reinhardt
Deyce Lee Robbins
Joseph Flake Schnebly
Heather Elaine Scott
Jennifer Scott
Shana Gaye Shirts
Mary Sue Scoville Smith
Carrie Standifird
Laurel Ann Starkweather
Michelle Sudweeks
Marin Ann Pearson Tang
Andrea Thomas
Jaine Adams Vorwaller
Rebecca Marie Mitchell Wendel
Stephanie Lyn Whiting
James Dickson Williams
Renee Marie Williams
Shelley Dawn Windsor
B. S. (14)
Jennifer Lee Aceves
April Ashton
Christopher David Barlow
Michael David Barrus
Daniel David Blodgett
Kathy Rowley Eldredge
Karl Richard Fails
Karen Renee Kitchen
Elisabeth Fraser Larson
Kurt Henry Overhiser
Ezra Wade Richards
Gretchen Rimmansch
Shane Tang
Holly Strong Woodman
**M. S. Thesis (1)**
Greg Perkins
**M. S. Non-Thesis (1)**
Lorraine Hellewell

**August 1999**
**B. A. (25)**
Rachelle Lee Bedell
Kristin Karin Busselber
Douglas Lyman Corey
Cindy Lee Cox
Leejean Ellis
Eric Gordon Ferrin
Hallie Marie Woods Fielding
Heather Fisher
Tamara Kay Gandolph
Andrea Jeffs Hadlock
William Andrew Harris
Veronica Frances Haymore
Jill Marie Hoge
Cindy Michelle Hughes
Michelle Lorraine Jones
Kandice Udy Kunz
Alice Mary Robertson
Joseph Flake Schnebly
Gretchen Gayle Sterling
Melinda Ruth Stout
Carol Ann Talley
Gregory Lynn Thompson
Christina Marie Rose Wadley
Erika Knight Ward
Christy Ann Westover
**B. S. (6)**
Andrew Cornell Forgrave
Nathanial Alan Hammond
Crystal Davis Marx
Rebebecca Ann Nesbit
Leland James Taylor
Scott Michael Watson
**M. A. Non-Thesis (2)**
Kirsten Gilson
Lars Nordfelt
**M. S. Thesis (2)**
Earl Cahill
Todd Fisher
**M. S. Non-Thesis (3)**
Sarah Brown

Thomas Milligan
Denise Raynes
**Ph. D. (2)**
Fengxin Chen
Junping Wang

**December 1999**
**B. A. (15)**
Rachel Allen
Matthew John Baker
Jamie Baxter
Kimberly Checketts
Elisabeth Clark
Lisel Freestone
Jeana Sue Chilton Hatch
Beth Ann Musick
Liesl Brigitta Pykles
Kami Cheree Rhoades
Eden F. Sorensen
Andrea Dawn Stewart
Cary Yuita Takara
Hilary Nan Turley
Ginnette Gardner Wood
**B. S. (3)**
Jeremy Keith Humpherys
Brenda F Peterson
James Thorvald Zimmerman
**M. S. Thesis (2)**
Jane Loftus
Emma Turner

**April 2000**
**B. A. (34)**
Tara Ward Beckstead
Rebecca Lynne Brammer
Angela Brothers
Andrea Marja Croft
Trenna Gardner
Wendi Sue Giles
John Dennis Hanks, Jr.
Rachael Kay Hawkins
Janalee Rachel Jeffery
Heather Elida Jones
Margaret Kesler
Jessica Nelson Larsen
Renata Louise Lawson
Travis Lee Lemon
Natalee Dawn Lloyd
Timothy Samuel Logan
Rebecca Diane Marshall
Terrie Lynn Meyer
Tamara Blake Myers
Danielle Dione Nations
Julie Marie Peel
Melissa Brown Quinn
Heather Marie Rice
Melany Lynn Rice
Marcia Ling Riddle
Cara Leslie Shirk
Kari Peterson Shirk
Douglas Alan Summers Stay
Mary Noel Talbot
Elizabeth Marie Turner
Erika Knight Ward
Kandelyn Richins Western
Sarah A. Zachreson
Samuel Robert Zogg
B. S. (14)
Kenneth Johnm Biehl, Jr.
Michelle K. Bylund
Erin Eileen Chamberlain
Lung Feng (Oliver) Chen
Angela Marie Duncan
Lara Stout Gordon
Vardges Levon Levonyan
Clay S. MacArthur
Gary Alan Middlemiss
Lars Erick Olson
Nansen Petrosyan
Paul Bryon Smith
William Arthur Taysom
Lance S Wheelwright
M. A. Thesis (1)
Jennifer Stanley
M. A. Non-Thesis (3)
Anne Crosland
Jana Rigby
Cynthia Ruchti
M. S. Thesis (2)
Danial Howard
Jeremy Magland
M. S. Non-Thesis (2)
Hugh Brown
Gina Thompson

August 2000
B. A. (25)
Melanie Marie Borom
Clayton D. Brown
Melanie Burgess
Rachel Ann Cawley
Troy Richard Clarke
Carrilyn Clarkson
Susannah Romney Cotterell
Brad D. Crowther
Annalee Draper
Monica Howard Ferreyra
Krista Lynn Goeringer
William Edward Guerin
Joseph Carter Haroldsen
Samuel Joseph Losik
Bonnie Jean Lynes
Thomas Lee Marker
Rebecca Diane Marshall
Melissa Sue Moore
Hy Mari Peery Murdock
Michael Jared Rich
Amy Lee Rose
Margrethe L. Stevens
Nikki LaRee Waller
Matthew Michael Webb
Kelli Marie Whetstone
B. S. (5)
Erin Elizabeth Dean
Micole Rogers Hansen
Paul David Hedrick
Lars Erick Olson
Brad Everett Strum
M. S. Thesis (1)
Jonathan Bodrero
M. S. Non-Thesis (3)
Jessie Bunting
Spencer Hall
Brian Liechty
Ph. D. (1)
Kathryn Andrist

December 2000
B. A. (11)
Rachel Anne Cawley
Lena Marie Cheney
Sheree Ann Christensen
Linda Hui Lin Furuto
Holli Huff
Steven D. Lang
Crustal Madsen Magleby
David Alan Petersen
Brandi Lynn Taylor Robertson
Margrethe L. Stevens
Amanda Louise Yauncey
B. S. (4)
Paul Michael Jenkins
Lence Kent Mortensen
John Richard Vogler
Rachel Wood
M. S. Non-Thesis (1)
Michael Leon Higley

April 2001
B. A. (27)
Emilee Serena Anderson
Jill Coombs Bodine
Jill Y Chang
Jennifer Call Chantry
Marshall D. Christensen
Crystal Lynn Coleman
Jamie Lynn Cook
Heather Marie Davis
Tamra A German
Kathleen Bess Hagerty
Jessica Ann Hannan
Michelle Hannah Harker
Sean Patrick Healy
Allison Holdaway
Rachel Holtkamp  
Amy Renée Hulse  
Kari Kaye Huxford  
Vickie Tams Kern  
LaTisha Joanne Knight  
Rebecca Louise Meese  
Diana Istoek Miner  
Nathan Allen Niles  
Thomas Earl Ricks  
Aubrey Leigh Robinson  
Peter Allen Salay  
Kristie Ann Spencer  
Lisa Trunnell  

**B. S. (11)**  
Emma Kathleen Price Bullock  
Steven Kay Butler  
Michael Aaron Carey  
Rebecca Gaye Dalmas  
Leslie Jane Foster  
Simon Lee Hill  
Pace Peterson Nielsen  
Rachel Gardiner Radoff  
Ryan Dean Stones  
David Joseph Watkins  
Andrew Jonathan Witt  

**M. S. (1)**  
Shane Tang  

**August 2001**  

**B. A. (17)**  
Caitlin Judith Strang Carter  
Kathleen Eng Chartrand  
Meggan Marie Cook  
Lisa Joy Erickson  
Ruth Finlinson  
Lee Wardle Garff  
Sean Patrick Healy  
Megan Thorpe Inouye  
Grace Jinhee Jung  
Tawny Farmer Kesner  
Swan Kim  
Kelly England Louder  
Rebecca Louise Meese  
Layne T Smith  
Kristie Ann Spencer  
Kim Marie Child Wake  
Drusilla Ellen Willhite  

**B. S. (10)**  
Erik Paul Anderson  
David Bryant Buhanan  
Joseph Sung-hwoon Choi  
Adam Wade Coburn  
Carrie Michelle Coleman  
Rebecca Gaye Dalmas  
Mariani Rozelen Finkenhagen  
Heather Gene Manwaring  
Jeremy Lon Ricks  
David Joseph Watkins  

**M. A. (1)**  
Douglas Lyman Corey  

**December 2001**  

**B. S. (6)**  
Edward Lee Anderson  
Berton Allen Earnshaw  
Matthew Collier Harward  
Randall D. Henderson  
Tracy Anne Jorgensen  
Mark J. Noakes  
**M. S. (2)**  
Andrea Perrine  
John R. Vogler  

**April 2002**  

**B. S. (16)**  
Erik Paul Anderson  
Michael David Barrus  
Karen Kathleen Brown  
Melissa Camille Clayton  
David Noyes Jeppesen  
Camille Rae Jones  
Aaron Garth Mills  
Dustin B. Moodyu  
Johathan Hawkins Pacheco  
David Aaron Palmer  
David Merrill Pardoe  
John Jacob Payne  
Steven Jacob Paxman  
Benjamin Zachary Webb  
Matthew Barnett Weber  
Rebecca Joan Wilhelm  
**M. S. (2)**  
Ruoya Liu  
Danae Romrell  

**June 2002**  

**B. S. (1)**  
David Joseph Watkins  

**August 2002**  

**B. S. (8)**  
Jessie Garrett Barnes  
Julie Brinton  
Mitchell John Dabo III  
Timothy A. Hansen  
Alisa Emiko Izu  
Maria Luz Jenson  
John Jacob Payne  
Sara Jean Rawson  
**M. S. (4)**  
Elizabeth Hutchings  
Paul M. Jenkins  
Rachel Wood Jenkins  
Erin E. Summers  
**Ph. D. (1)**  
Nephi A. Noble
December 2002
B. S. (16)
Tiffini Lynn Christensen
Eric R. Eliason
Brian Francis Hansen
Alisa Emiko Izu
Jacob John McIntyre

April 2003
B. S. (15)
Micah Scott Allred
Aaron G Benson
Vonn Robert Christenson
Eric Llewellyn Goodman
Linda Sue Grizzle
Cristina Daneille Montanino Heim
Daniel K. Hwang
Michelle Kitchen
Brandon Kent Mackay
Mark Hansen Meilstrup
Casey Patrick O’Dwyer
Rebecca Palmer
David Yoshi Patten
Willis Lauritz Petersen III
Regan S. Vaughan
M. S. (2)
Steven Kay Butler
Marcia Ling Riddle

August 2003
B. S. (7)
John H. Bankhead
Rachel Coates
Allen Joel Dickson
Casey Patrick Johnson
Steven Robert Jones
Lauren Allison McKinlay
Sarah Marie Murri
M. S. (1)
Berton Earnshaw

December 2003
B. S. (15)
David Michael Andrist
Charity LaVon Arnold
Norma Leigh Foote Bergaust
LaDawn Brady
Lauren Marie Candland
Amber Isaac Colby
Amber Cook
Heather Reneé Dickerson
Jennifer Rebecca Holt
Michelle Peterson Johnson
Megan McKinnon Mullins
Keri Lyn Pittard
Christopher Richard Pocock
Mary Brynn Shaw

Jacque Paxman Westover

M. S. (4)
Jason Grout
Leslie Pack
Gretchen Rimmash
Julie Britton Rogers

April 2004
B. S. (23)
Dustin David Belt
Jon Nathan Blackhurst
Leah K Brown
Christopher Robert Cornwell
Patrick Kimball Curtis
Sharleen Adrienne de Gaston
Grant Verdell Farnsworth
Jon Richard Fredrickson
Emily Ann Gubler
Joseph Anderson Hopper
David Isaac Ketcheson
Jason Ralph Largey
Debra Orris Linford
Erek Park Loosli
Spencer Brent Lythgoe
Jason Walter Munyan
Scott Glen Murdock
Aaron Paul Pinegar
Kara Mae Redlin
John Frederick Robinson
John Henry Sinkovic III
Sara Smoot
John E Stovall
M. S. (4)
Michael David Barrus, Jr.
Dustin B. Moody
Michael Wayne Moore
Benjamin Z. Webb

August 2004
B. S. (15)
Jennifer Suzanne Atherton
Donald Dunlap Bennion
Robert William Bradshaw
Christina A. Call
Nicholas DeWaal
Heather Aurora Florence
Suzanne Kitchen Forbush
Brent Benson Gorbett
Jason Ralph Largey
Joseph Phillip McMullin
Chace Kmetzsch McNeil
Landon Kimball Mortensen
Adam Lee Rich
Megan Alane Sidwar
William Daniel Simmons
M. S. (3)
Robert Dan Berry

Robert Dan Berry
Celeste Dawn Elton
Glen Edward Simpson
Ph. D. (1)
Sarah M. Brown

December 2004
B. S. (2)
Samuel Chia-Lin Chiu
Lindsay Mae Weinberg
M. S. (1)
Matthew Barrett Weber

April 2005
B. S. (10)
Jed Peterson Bailey
Thomas Andrew Bell
Beau Anderson Burgi
Edward Ronald Cannon
Ryan Lewis Cooper
Jacob Devin Durrant
Clifford Dean Mefford III
Charles Brigham Miller
Stephen Michael Taylor
Darryl Gene Wade

August 2005
B. S. (12)
Gregory J Andrews
Scott David Daniels
Edward Ronald Cannon
Lucinda Chiu Hancock
Ashley Ann Sheffield Heid
Aaron Thomas Hill
Kerri Lee Huebner
Kathryn Elayne Lawyer
Don Daniel March
Kathrine Heiner Paget
Chantelle Rowe
Sean Michael Tibbitts
M. S. (9)
Robert Anderson
Ivan Andrus
Allen Dickson
Linda Grizzle
Brian F. Hansen
Casey Johnson
Steven R. Jones
Mark Meilstrup
W. Lauritz Petersen
Ph. D. (1)
Benjamin Woodruff

December 2005
B. S. (9)
Michael Paul Baily
Amy E. Brown
Adam Scott Chipman

Sally Gurr
Andrew Michael Hunter
Ryan Wayne Johnson
Kathryn Elayne Lawyer
Don Daniel March
Laura Knight Robeck
M. S. (2)
Amanda Ellis
Heather Melo

April 2006
B. S. (17)
Adams, Matthew C
Baier, Erika
Boring, Brian
Cannon, Laura
Clawson, Amber
Croft, Micah
Dimond, Diana
Esselman, Michael
Harmon, Ryan
Hernandez, Erika
Kearl, Audrey
Kent, Curtis
Manwaring, Nathan
Moore, April
Polay, Elizabeth
Thomas, Toni
Whitehead, Jared

June 2006
B. S. (1)
Jones, Cree

August 2006
B. S. (9)
Atkin, Ashley
Bates, Brandon
Bregante, Nicolas
Christiansen, Diane
Dewitt Meghan
Durtschi, Rebecca
Holgate, Andrea
Larson, Joshua S.
Walton, Charlotte
M. S. (5)
Belt, Dustin
Blackhurst, Jonathan
Cornwell, Christopher
Housley, Matthew
Roberts, Sharleen
Ph. D. (1)
Xie, Zhifu

December 2006
B. S. (8)
Balmer, Robert Edwin
Bellows, Jennifer Lynne

243
Bodily, Joshua Davis
Carlston, Laura Jean
Hansen, Brittany C.
Kellnerova, Sandra
Kerby, Brent L.
Potter, Heather L.
**M. S. (2)**
Eliason, Eric
Sinkovic, John

**April 2007**
**B. S. (23)**
Allen, Mark A.
Cook, Katrina Lynn
Goodman, Charles Michael
Harmon, Jonathan P.
Hendricks, Mark E.
Hutchings, Jeffrey B.
Luo, Yi
Lutz, Steven S.
Moore, Jared M.
Owens, Kayla Denise
Penrod, Keith G.
Perry, Nathan C.
Powell, Kevin James
Priddis, Nathan C.
Quimby, Michael James
Rigley, Michael Clay
Rohrer, Rebekah Ann
Rolf, Brittni Kaye
Rosengren, Wayne Bennet
Rushton, Brian Craig
Scott, Marcus W.
Tay, Julian Boon Kai
Van Tassell, Natalie
**M. S. (2)**
Bell, Thomas
DeWaal, Nicholas

**August 2007**
**B. S. (13)**
Bailey, Sean
Barker, Blake H
Dougal, Casey Mark
Farley, Heather Renee
Grigg, Nathan B.
Hawkins, Elizabeth Marie
Jensen, Daniel S.
Jones, Jaylan S.
Lee, Kelli
Mitchell, Melissa Anne
Rudd, Keith C.
West, Jeremy Michael
Wilde, Natalie
**M. S. (4)**
Penrod, Keith
Peterson, Aaron
Simmons, William

Taylor, Stephen
**Ph. D. (1)**
Grout, Jason

**December 2007**
**B. S. (3)**
Padilla, Patrick P.
Redd, Stephanie
Roderick, Thomas Edward
**M. S. (3)**
Carlile, Kerri Lee Huebner
Evans, William Ray
Tyler, Jonathan Glen

**April 2008**
**B. S. (19)**
Steven R. Adams
Christopher Kirk Brown
Samuel Mark Corson
Eric Scott Davis
Jared Daniel Duke
Dallas L. Gilmore
John David Gruver
Luke Butler Henderson
Karla Jeanene Hendricks
Russell Edward Howes
Mark Condie Kempton
Jared Thomas Meier
Carla do Ceu Nunes de Almeida
David Arthur Pendlebury
Rachael Pingel
Ryan Charles Rapp
Russell Matthew Ricks
Kelli Jo Stewart
James Benjamin Taylor, Jr.

**August 2008**
**B. S. (14)**
Steven R. Adams
Melanie Rose Anderson
Sarah Jean Brazee
Quinten Kip Christensen
Caleb Joel Coates
Vinh Xuan Dang
Dallas L. Gilmore
Britte Anne Nelson
Carla do Ceu Nunes de Almeida
Daniel Thomas Phillips
Gina Marie Russell
James Benjamin Taylor, Jr.
Benjamin Youell Warner
Benjamin David Wright
**M. S. (5)**
Xihui Chen
Brent Lloyd Kerby
Long Pham Bao Nguyen
Wayne Bennett Rosengren
Darryl Gene Wade
Ph. D. (2)
Zeng Lian
Gretchen Rimmelsch

December 2008
B. S. (4)
Katherine Ann Dedrickson
Brenda Faith Ginos
Joshua Wayne Lytle
Rebecca Marie Rowley
M. S. (2)
Matthew Conrad Adams
King Fai Pang

April 2009
B. S. (10)
Sebastian Ignacio Acosta
Erin Amott
Kyle Ray Brown
Nyssa Roderick Brown
Alyssa Marie Caserio
Hannah Choi
Amanda Erin Clingerman
Morgan Andrew Dennis
Minh Nhat Vo Do
Sterling Arthur Felsted
Steven D. Flygare
McKay Nathan Heasley
Jared Drew Johnson
Sarah Christine Johnson
Wesley Alonzo Jones
William L. Krohn
Benjamin Merrill Lewis
Courtney Brynne Longhurst
Sarah Margaret McBride
Kelly Beatrice Otis
Kristy L. Parkinson
Pamela Ruper
Skyler Clayson Simmons
Christopher Bruce Verhaaren
John Christian vom Lehn
Brandon John Wilson
M. S. (1)
Brian Craig Rushton

August 2009
B. S. (10)
Angelos, Bryant W.
Coatney, Ryan D.
Howe, Brent
Patt, Spencer R.
Rathnakumara, Himal
Redd, Tyaor hardison
Van Matre, Megan Ilene
Williams, Basil J.
Wright, Ian Joseph
Yang, Xiao
M. S. (9)

Blake Hillstead Barker
Natalie Bergin
Yi Luo
Kayla Denise Owens
Nathan Cannon Perry
Kevin James Powell
Nathan C. Priddis
Jeremy M. West
Natalie Wilde

December 2009
B. S. (3)
Adams, Richard Allen
Richards, Katie Krystal Hunsaker
Wight, Todd Brandon
M. S. (3)
Yuren He
Steven Scott Lutz
Jennifer L. Schofield
Ph. D. (1)
Duokui Yan

April 2010
B. S. (25)
Baker, Jonathan Peter
Burton, Christina Marie
Busath, Peter Matthew
Caldwell, Mark Allen
Chou, Han-Chung
Dorff, Rebecca
Duvall, Suzanne Camille
Elison, Paul Joseph
Ellis, Braden Dean
Forkner, Jefferson Gaines
Germaine, Kimball Richard
Hull, Jordan T.
Keller, Joseph Aaron
Malani, Chelsea Rose
Lee, Sheng Hung
McClurkin, Ryan Michael
Nelson, Curtis G
Petersen, Beth Linford
Quast, Stacie Marie
Ruggles, Colleen
Tuft, Jaimie Jeanne
Turley, Patrick A
Veibell, Matthew Todd
Walton, Alan Arthur
Ward, Candice Marett
M. S. (2)
Corson, Samuel Mark
Ricks, Russell Matthew
Ph. D. (1)
Chen, Sijin

August 2010
B. S. (14)
Blankenagel, Jason K
Bown, Stasha Ann
Burton, Stephan D
Dilts, James Paul
Easton, Mckay Whetton
Johnson, Jordan Kimball
Perry, Jeffrey E
Sampson, Donald Charles
Tappen, Henry P
Teemant, Leo
Truong, Minh Nguyen Duy
Willis, Tyson David
Wilson, Brigham Bond
Yeung, Enoch Ho-Yee

M. S. (2)
Kempton, Mark
Taylor, James Benjamin

Ph. D. (3)
Hansen, Brian
Lambert, Lee R
Meilstrup, Mark H

December 2010
B. S. (5)
Burrup, Sharon L
Pickett, Casey Robert
Stoker, Nathan R
Webb, Jared Anthony
Willnauer, Dessie Rachelle

April 2011
B. S. (26)
Lillie Paula Avalos
Peter A Barrow
David Wallace Bennett
Brock Allen Tanner Boyce
Gabriel H Briggs
Warren Layne Crutcher
Matthew Price Edwards
Daniel Benson Fenn
Michael John Griffin
Christopher Abraham Guzman
Megan Elyse Harris
Ariana Marie Hedges
Daniel Miller Jensen
Ryan James Jensen
Nathan Kent Karren
Marie Coy Killian
Tim Ryan Krumwiede
Charles Joshua Stillman LeMaistre
Jeremy David Nicholls
Jocelyn Ednabell Peck
Sterling Gary Petersen
Beth Shumway
Dane Christian Skabelund
Jonathan Michael Stevens
Mason Lemoyne Victors
Dustin Allen Workman
M. S. (2)

Ryan Dean Coatney
John David Gruver

June 2011
B. S. (7)
Matthew Price Edwards
Andrew Cowley Johnston
Jason T Camosi J
Jialin Li
Emily Jean Mortensen
John Jacob Ross
Beth Shumway

August 2011
B. S. (12)
Daniel Sundquist Brown
Shalise Colette Akemi Conger
Jeffrey James Hendricks
Nathan Kent Karren
Chelsea Johnson Kennedy
Nathan Douglas Marshall
Ryan William Murray
Preston Tann Redd
Kendall Elisabeth Seppi
Evan McAllister Stevens
Mary Erin Stevens
Melissa Dickson Wells
M. S. (9)
Vinh Xuan Dang
Minh Nhat Vo Do
J. Drew Johnson
Sarah M. Luo
Joshua Wayne Lytle
Melissa Anne Mitchell
Spencer Robert Patty
Sebastian Ignacio Acosta Valenzuela
Ka Lun Wong

December 2011
B. S. (9)
Jeremiah Christopher Clark
Nathan Eric Green
Joan Marie Madsen
Nicole Andrea Malloy
Melissa Simek Price
Katie Celeste Pruden
Robert Michael Schoenhals
Adam Michael Trombly
Bradford James Tuckfield
M. S. (2)
McKay Nathan Heasley
Skyler Clayson Simmons

April 2012
B. S. (30)
Joseph Allen Adams
Michael Steven Andersen
Kimberly Anderson
Ryan Dayley Boyce
Daniel Logan Carrier
Jonathan Casey Christensen
Matthew Kirk DeCelle
Joshua Taylor Fetbrandt
Danielle Nicole Janzen
Sanjeev K C
John Victor Lopez
Scott Charles Mancuso
Benjamin Michael Mecham
Erica Nicole Nielson
Leslie Ostler
David M. Page
Ryan Jacob Plater
Emily Poai
James Kenneth Pringle
Christopher Paul Read
Aaron William Rickett
Morgan Kay Rogers
Clinton Hayward Rollins
Matthew Thomas Scott
William Nelson Sexton
Neil Evan Steinburg
Henry Richard Thomas
Stephanie Nicole Uhl
Ryan D Viertel
Stephanie J Willoughby
M. S. (1)
Donald Charles Sampson
Ph. D. (1)
Brian Craig Rushton

June 2012
B. S. (8)
Alvaretta Grace Bair

Rebecca Sue Brogan
Scott Levi Davidson
Emily Davis
Christopher James Hettinger
Aubrey Michelle Lydikson
Benjamin Joseph Miller
Tanya Michelle Santana
Ph. D. (1)
Long Bao Nguyen

August 2012
B. S. (10)
Guang Chen
S. Adam Fletcher
Danielle Hanks
Bryan James Hardy
Rachel Marie Messick
Philip E Paré
Matthew Daniel Romney
John Samuel Shackelford
Rachel Megan Suggs
Crystal Lynne Wick
M. S. (6)
Jonathan Peter Baker
Christina Marie Burton
Stephan D. Burton
Chelsea Lorraine Kennedy
Evan Durk Merrell
Curtis G Nelson
Ph. D. (4)
Amanmda Ellis Francis
Ji Li
Yi Luo
Emma Louise Rode Turner
Appendix 7. Putnam Competition Results

The William Lowell Putnam Mathematical Competition was established in 1938 as a contest in mathematical problem solving for undergraduates in American and Canadian colleges. Each institution could designate three team members (whose scores would determine the team score) and as many alternates as they desired. The contest exam is typically a set of six problems to be solved in a three-hour time period, followed by a break, then six more problems to be solved in another three-hour time period. The problems are not the kind that would occur in a normal math class and, while not requiring exceptional mathematical knowledge, do require prodigious insight, ingenuity, and cleverness. The median score is typically 0. Those who rank high are enthusiastically sought as graduate students.

Students from BYU have been competing since 1965. Coaches, who also administer the exams, have been Dr. R. Vencil Skarda, 1965–2000, Dr. Darrin Doud, 2002–2007, Dr. Tiancheng Ouyang, 2008–present, and Dr. Pace Nielsen, 2009–present. Student performance and participation are summarized below, insofar as we have been able to recover the record.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of BYU Participants</th>
<th>BYU Team Rank</th>
<th>Number of Teams</th>
<th>Number of Contestants</th>
<th>Top BYU Indiv. Rank</th>
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</table>

Participants from BYU

1965
Crockett, Robert N.
Harris, Roger Wright
Parry, Vinette
Williams, William A., Jr.

1966
Brinkerhoff, Mary
Hall, Dean
Harris, Roger
Meachan, Michael
Vetterlein, David

1967
Bailey, David H.
Bartholomew, Dan
Bills, Bruce
Ehat, Andrew
Hill, Margaret
Hill, Ronald
Monson, Stephen

1968
Bartholomew, Dan
Collings, Bruce
Despain, Keith
Dotter, Gerald
Goodwin, Eric
Monson, Stephen
Wright, David

1969
Despain, Keith
Edwards, Mike

1970
Harrison, Gary
Heaton, Hal
Landon, Glen
Litchfield, Kay
Scott, Larry
Wright, David

1971
Craig, Alan
DeLong, Peter
Edwards, Michael
Gardner, Michael
Litchfield, Kay
Pearce, Kent
Ricks, Douglas
Wilson, Robert
Witt, Brian

1972
Collings, Bruce
Doty, Georgiana

1973
Ehat, Andrew
Kennison, Angela
Monson, Steve
Oviatt, Gary
Roberts, Douglas
Thompson, Charles

1974
Adams, Richard
Coombs, Robert
Drake, Danny
Heaton, Hal
Langford, Mark
Moffett, Calvin
Nielson, Glen
Simmons, Forrest
Stout, Bryn
Tenney, Merle
Thompson, Charles

1975
Simmons, Forest
Colton, Don
Winkler, Andy
Wickes, Gene
Appleberry, Kent
Klingler, Ken
Lund, Mark
Nelson, Jeff
Nielson, Glen
Smith, Carey
Durney, Ed
Harvey, Bryan
Smith, Kyle
Taylor, Michael
Loosle, Brent
Moffett, Rodger
Petit, Daina
Richmond, Mark
Blaylock, Gary
Morrise, Matthew

1976
Barker, Brent
Callister, James
Colton, L. Don
Hiatt, Paul
Howell, Anthony
Howes, James
Jeffrey, Reed
Jensen, Delos
Klingler, Ken
Moffitt, Calvin
Morin, Brad
Morrise, Mark
Perkins, Steven
Robinson, Alan
Roundy, Robin
Simmons, Forest
Van Dam, David
Winkler, Andrew

1977
Aton, Bill
Callister, Jim
Dalton, Denise
Harrison, Alan
Howes, Jim
Kite, Chris
Klingler, Ken
Morrise, Mark
Mott, Greg
Ogilvie, John
Robinson, Alan
Roundy, Robin
Spencer, Brett
Thorley, Steve
Winkler, Andy

1978
Brown, Alan
Christensen, Thomas
Eaves, laura
Fluckiger, David
Harrison, Alan
Kite, Chris
Mcghie, Brian
Mikat, Kathryn
Moffett, Calvin
Montgomery, Kent
Morrise, Matthew
Robinson, Allen
Smithwaite, David
Stout, Bryan
Thorley, Steve

1979
Hales, Thomas C.
Harding, Keith
Lawlor, Gary
Mcghie, Brian
Morrise, Matthew
Stout, Bryan
White, Gary

1980
Cook, David
Eves, Laura
Hales, Jane
Lauret, James
Lawlor, Gary
Morrise, Matt
Perkins, Steve
Stout, Bryan

1981
Adams, Jeffrey
Bickmore, Dan
Cooper, Glen
Hunsaker, Nathan
Stanford, Ted
Stornetta, W. Scott

1983
Aiken, Wayne
Bennett, Daniel
Gingrich, Scott
Grant, Christopher
Howell, Tony
Lawlor, Gary

1984
Aiken, Wayne
Grant, Chris
Bennett, Dan
Howell, Tony
Cardall, Bruce
Morin, Chris
Barnes, Dann
Jarvis, Tyler
Black, Kevin

1985
Bennett, Dan
Black, Kevin
Dean, Matthew
Fearnley, Laurel
Grant, Christopher
Lee, Tae
Morin, Chris
Ouimette, David
Soderborg, Nathan
Stanford, Ted
Yashimoto, Stacey

1987
Black, Stephen
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Jensen, Lisa
Malmstrom, Lori
McKinnon, David
Nuzman, Julianne
Turner, Mary Ellen

1988
Carlson, David
Ellenburger, Tim
Ferguson, Sam
Jarvis, Tyler
O’Hara, Michele
Robertson, John
Tripp, Allyson

1989
Barrett, Clark
Dean, Matthew
Duffin, Kirk
Ferguson, Samuel
Robertson, John

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Ferguson, Samuel
Klein, Rob
Mok, Man-Kam
Ringger, Eric

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Landon, David
Morales, M. Tomas
Pack, Nicalla
Robertson, John

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Anderson, Jeff
Barrett, Clark
Hall, Tracy
Hopper, Gordon
Oldham, Laura
Robertson, John

1994
Barrett, Clark
Draper, Tom
Evenson, Andrew
Hall, Tracy
Peterson, Adam

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Evenson, Andrew
Durham, Michael
Witt, Andrew
Nesbitt, Becky

1996
Fisher, Todd
Witt, Andrew

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Levonian, Vardigues

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Bylund, Michelle
Chiu, Samuel
Hansen, Brian
Witt, Andrew

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Cook, Phillip
March, Don
Vogler, John

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Evensen, Stein Store
Hansen, Brian
Howes, Russel
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Robinson, John
Rosengren, Wayne

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Anderson, Robert W.
Bell, Thomas
Blackhurst, Jon
Boring, Brian
Bradshaw, Robert
Cannon, Edward
Chiu, Sam
Cornwell, Christopher
Fredrickson, Jon
Gleason, Randi

2004
Acosta, Pedro
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Chiu, Samuel
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Hill, Aaron
Hobbs, Jacob
Jensen, Daniel
Johnson, Drew
Jones, Cree
Lawyer, Kathryn
Rathnakumara, Himal
Raykhel, Ilya
Sampson, Donald
Swift, Hales
Wade, Daryl
Whitehead, Jared
Yang, Yu

2005
Anderson, Nickolas
Boring, Brian
Christensen, Jonathan
DeWitt, Meghan
Dilts, James
Do, Minh Nhat
Fletcher, Adam
Griffin, Michael
Howes, Russell
Lee, Chul-Woo
Manwaring, Nathan
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Richards, David
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Sieber, Christian
Swift, Stephen Hales
West, Jeremy

2006
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Dennis, Morgan
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2007
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Hendricks, Karla
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Sundar KC, Sanjeep
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2008
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Cardon, Joseph
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Griffin, Michael
Mortensen, Megan
Neely, Bradley
Pratt, Kyle
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Appendix 8: Excerpts from the Annual Reports

The first three excerpts are from the annual reports of the College of Physical and Mathematical Sciences. The remaining excerpts are from the annual reports of the Department of Mathematics. These excerpts give statistical details and commentaries beyond what is found in the narrative history.


Grant Mason as Dean: Department of Mathematics

The statistical profile indicates that the number of bachelor’s degrees continues an increasing trend which began in the late 1970s while the graduate program (Masters) remains roughly on a level of 2-5 graduates per year. Research by students is generally not presented at meetings nor in papers either as authors or co-authors. Undergraduates, on the other hand have competed very well in the Putnam Mathematical Competition which is sponsored annually by the Mathematical Association of America. In the most recent competition, involving 2079 undergraduates from 348 institutions in the United States and Canada, the department placed 31st and last year the department placed 13th. These are very respectable rankings and speak well for the department and its students.

The number of refereed papers shows an increase over the past five years, particularly in the past two years, while the number of papers read at professional meetings is rather steady at about 15. Mathematics papers, stemming as they do from pure intellect and generally without the help of technology, are hard to come by. The number of faculty publishing in refereed journals in a given year is about 12.

Undergraduate student credit hours are relatively constant, but the profile shows that the number of undergraduate majors began increasing fairly substantially in 1983-84. The number of graduate majors has been fairly stable over the past five years, but the number of graduate student credit hours has more than doubled over the same period because advanced undergraduates take graduate courses. At the same time the number of courses taught seems to have been trimmed leading to a ratio of courses taught to faculty of 2.28 (Fall 1985).

The Chairman of the department feels that this ratio is acceptable. Average class sizes are consistent with the rest of the College.

The curriculum is structured and hierarchical. The subject matter almost dictates a traditional curriculum. However, during the past eight months, extensive consultations with the administration of the College of Engineering, a group to whom the department owes a service responsibility, have resulted in a proposal for a change in the engineering mathematics program. A shift in the content and structure of Mathematics 214 (Analytical Geometry, Calculus 3), Math 321 (Ordinary Differential Equations) and Math 322 (Linear Algebra and Complex Analysis) is being considered.

A review of the student contract and student wage figures shows that the cost per student credit hour for major and service courses is very low by College standards. We need to provide additional support so that student problem assignments can be evaluated. I continue to believe that there is no substitute for problem solving and construction of proofs in learning mathematics, but we cannot expect students to do such work unless we have support to evaluate the work. With the very large student credit hours generated in these courses, faculty simply cannot do it themselves.

During the past year the chairmanship of the department was reviewed leading to the reappointment of Peter Crawley as chairman and the appointment of Hal Moore as assistant chairman. Although the department continues to be divided roughly into three camps, the faculty generally spoke highly of the leadership of the department. A relatively few have some misgivings about the directions being taken by the department as it moves toward greater emphasis on research, particularly as it involves hiring outside the Church. The emphasis on research and the present effort to develop a PhD program are generally acknowledged to be desirable, however. Many of the faculty expressed very strong feelings about the importance of teaching and helping students. The large class format is frustrating the need this faculty feel to develop close ties and rapport with students.

An almost unanimous criticism of the department was the lack of faculty meetings and open discussion. (One should note that when meetings have been held in the past they have often had a record of unproductive
discord.) In response the department has taken steps to conduct more faculty meetings and open discussion. Further, the department has agreed to establish and maintain an infrastructure of committees to try to create a governance system, which is somewhat less chairman-oriented. The assistant chairman has also been given a larger role and, to my knowledge, this is working well.


Grant W. Mason, Dean: Department of Mathematics

Statistical Summary: The number of undergraduate majors remains at a plateau reached three years ago, while the number of graduate majors is starting to climb. With the new PhD program we expect this latter trend to continue. The number of graduates in both undergraduate and graduate degree programs are stable. One undergraduate from Mathematics presented a paper at our Spring Research Conference, but relatively few students in Mathematics either present or write papers on mathematics research.

As we began to see over a year ago, the failure rate in Math 110 <College Algebra> has been cut in half and has been cut even further during Spring and Summer terms. Math 110 remains a concern to the department. Some small sections are scheduled for Fall 1987, and the number of these will grow as the pool of good graduate students able to teach them grows. New examinations for the remaining large sections are ready with less intimidating distractors. This is an experiment we are all watching with keen interest.

Publication of refereed papers remains at the elevated level achieved three years ago. The number of faculty publishing at least once remains at twelve. This level is a relatively small percentage of the total faculty, but a very high percentage of the core of research mathematicians which have come in the last few years. Faculty are more active than ever before in presenting invited lectures, chairing sessions at meetings, submitting research proposals, and obtaining funding. Service is also rendered to the profession through reviews and by service on editorial boards.

PhD Program We have been very fortunate to start the PhD program with four genuine PhD students and several other Masters students who might develop into PhD students. Most of these, however, have come from BYU. The challenge is to attract good students from the outside. Our best potential source at the moment is the pool of LDS students at other universities, and we are working to improve our ability to reach these students.

Conferences One of the most notable activities of the past several years has been the hosting of mathematics research conferences at BYU. The “Year of the Partial Differential Equation” organized by Peter Bates brought twenty researchers to campus for short or extended stays, including Nicholas Alikakos and Paul Fife who came for more than a full semester. Approximately one hundred others came either to Provo or to Snowbird to participate in one of the two conferences organized by BYU. Support for these conferences came from the National Science Foundation and from BYU.

James Cannon and David Wright also organized a summer research conference in topology on campus and at Sundance, August 10-14. Don Snow gave a special 4-hour mini-course on using computers in teaching calculus and other courses at the Summer Meeting of the Mathematical Association of America in Salt Lake City.

All of these activities, which are practically invisible on the statistical summary sheet, are excellent indicators of the professional development of the department.

Pressing Needs The department is still struggling to provide student assistants in Math 110 and calculus. The slightly longer semester, the small increases in student wages, and the fixed budget all combine to hand us a real problem for the coming year.

The search continues for new faculty, including the establishing of relationships with some non-LDS faculty to whom we might consider extending offers. Likewise a search continues for new students for the PhD program.

Space in the Talmage Building remains perhaps the most vexing problem. Douglas Garbe still remains in the Knight-Mangum building.

Grant W. Mason as Dean: Mathematics Department Overview We are beginning a PhD program in Mathematics. We have already been able to enroll some very good students into the program. Using the PhD students as teachers we are beginning to return to smaller classes, particularly in College Algebra (Math 110), a move that we feel is important to the teaching of mathematics. The increased graduate enrollment is further exacerbating our space problem in the Talmage Building, but we are grateful and excited for the relief that will come with the new construction and remodeling.

The Mathematics department taught nearly 17,000 student credit hours in the Fall of 1988. Assuming the typical course is three credit hours, this translates into well over 5000 students per semester.

In each of the last several years, the department has been host to research meetings in various specialty topics in mathematics. These meetings have brought large numbers of visitors to the department, many of whom have stayed for periods ranging from a few weeks to an entire year. These visitors have been very impressed with what we are accomplishing and the climate we are creating for work in mathematics.

Statistics The number of undergraduate majors remains constant at about 300 while the number of graduate students is climbing rapidly. The newly instituted PhD program has not only attracted students on its own behalf, it has also aroused interest in the masters degree. The number of bachelor’s degrees likewise remains comparable to previous years, but the number of master’s degrees is double (or more) the number in each of the four preceding years.

The number of student credit hours taught by the department increased in the Fall of 1988. The department teaches about a third of the SCHs in the College although the size of the faculty is closer to a quarter of the College faculty.

The number of refereed papers by faculty and the number publishing at least one paper, text or manual both reached an all-time high this year. Several indicators show a growing professional strength.

External Review At the invitation of the department, David Eisenbud (Brandeis University), Jack Hale (Brown University and Georgia Tech), Hugo Rossi (University of Utah) and Tom Plummer (BYU) spent three days during this past year evaluating the department. A report is on file in the College and the department.

Triennial Review The following section contains excerpts from my report of the triennial review of the department. It was shared with the department chairman and academic vice president earlier in the year. As a part of the triennial review of the department, I have interviewed or received written responses from virtually every member of the regular faculty who is presently on campus.

The department is large and remains roughly divided into three camps: mathematics educators, college teachers and research mathematicians. It is difficult to make generalizations about the department, because there are many conflicting views. Someone is an exception to almost every generalization that is made below. Nevertheless, in general, there is near unanimity that the department has made good progress in the past few years and that the efforts to recruit research mathematicians and develop a PhD program are good and in the best interests of the department.

Teaching The Math 110 failure rate has improved, but still high by university standards and remains a source of discontent among faculty and students. The PhD program has provided additional instructors and some of the larger classes have been broken down into smaller ones. The remaining large classes will also be broken down soon. Where comparisons can be made, our experience seems to indicate that the best of the graduate-student instructors in small sections do better than the large classes taught by more experienced instructors, but the poorer graduate instructors do worse than the large sections. The department will strengthen its efforts for preservice and inservice supervision of graduate instructors in an attempt to achieve more uniformity among small sections. (Note added: Members of the department under the direction of Jan Wynn conducted a two-day, preservice workshop for Math 110 and Math 112 instructors in late August 1989. This will be followed with inservice visits by faculty members to those classes taught by graduate students. Another hopeful sign was that
the failure rate during summer term (taught by Helen Van Orman) was at an all-time low of 15%. This is to be compared with the 38% rate of several years ago.

The department teaches an unusually heavy number of student credit hours. Many of the classes are very large and there is unanimity among faculty that the large classes are not in the best interests of mathematics instruction. Calculus is almost certainly the most important foundation course in university mathematics and it is being taught in large 200-student sections that seem to be universally disliked by the instructors and many students. Thus we have a department in which faculty decide by lots who will “have” to teach what should be one of the key courses in the mathematics offering. Choosing by lots, no faculty member is forced to stay with the course for more than one year and teachers who are unsuited to large-section teaching alternate with those who are. The responsibility to improve, stabilize and supervise the course under the existing circumstances is badly diffused. This relationship of the department to its “bread-and-butter” course seems particularly unfortunate. The struggle with the large enrollments in calculus and college algebra predisposes the department to an image problem. I would estimate that 90% or more of the student complaints about teaching that make it to my office come from the mathematics department. In part, this reflects the larger share of the student credit hours taught in mathematics, in part the difficulty of the subject and, in part, the pre-college preparation (or lack of it) of the students, and in part the difficulty of handling the large numbers of students.

In the face of these difficulties, the faculty, especially the research mathematicians, must redouble their efforts to teach well and to cultivate (honorably) the good will of students. Mathematics is the foundation for much of university work and the department cannot be one that students view with aversion if we are to instill a love of learning at the university. The feeling that we must give more emphasis to improving undergraduate teaching is very broad in the department. The subject came up again and again in the interviews. Prominent young research mathematicians are joined by the college teachers and the secondary mathematics educators in expressing this sentiment. With a number of very disturbing national reports drawing attention to the deteriorating performance of students, the time is ripe to give encouragement and recognition to faculty who are innovators in undergraduate instruction, particularly calculus. The department needs to do more to develop the talents and energy of its existing faculty to bring them to bear on the problems of undergraduate education. Scholarly activity needs to be interpreted broadly enough that faculty who actually produce significant improvements in undergraduate teaching will receive recognition, respect and reward.

**Mathematics Education** One of the truly difficult issues facing the department is deciding its future in (secondary) mathematics education. By developing a commitment to research, the department has assumed a whole new dimension of responsibility without acquiring a significant increase in numbers of faculty. A faculty of forty members is seriously undermanned for the multifaceted tasks the department is trying to accomplish. It is trying to provide in-service assistance to practicing secondary teachers, it is providing pre-service supervision to student teachers, it is teaching a large service course offering to the university, it is training undergraduate and graduate mathematicians and it is conducting independent research. Within a short time, some of the mathematics educators (those focusing on training of secondary teachers) will begin to retire and the department will face the problem of hiring replacements. What should the nature of these replacements be? What is the future of “math education” in the department?

I think there is general consensus that if there is to be a math education group in the university, then it should be in the Mathematics Department rather than in the College of Education. Some disagree. However, I find it hard to understand how separating the preparation of teachers any further from mathematics than it already is will be in the best interests of nourishing the roots of mathematics. It is clear that our primary responsibility must first be to the task of teaching mathematics at the university. However, about half of the undergraduates in mathematics are seeking a degree in mathematics education. So long as we offer the degree, we are obligated to provide the supervision and some instruction of student teachers, since student teaching is a requirement for certification and, hence, for the degree. Research mathematicians and math education faculty alike acknowledge that the university faculty must exert their influence if mathematics education is to be improved in the elementary and secondary schools. However, the research mathematicians seem to see themselves visiting schools to help inspire students to the excitement of mathematics, while the math educators see themselves concentrating on methodology of teaching and on supervision of student teachers.

On the one hand the math educators feel that the research mathematicians do not understand what the educators are doing. They feel that until you go out and face the problems of discipline, motivation, inadequate preparation, etc. in the schools, one has no inkling of the task or how to deal with it. Competence in
mathematics is important, but only a part of the picture. Indeed a researcher expressed the opinion that there is a need for someone to do what the educators are doing, while expressing complete ignorance about what they are doing and his own desire not to do it whatever it is. One math educator expressed his frustration by noting that he is trying to offer in-service evening classes to poorly-prepared local high school teachers, trying to provide pre-service supervision to student teachers, trying to teach his share of courses at the university and trying to serve as a bishop. He admits to fatigue. None of these activities can be classified as “research” and although the teaching aspect of his work is important to advancement, the lack of research component would nevertheless not allow this faculty member to advance in rank.

On the other hand, some of the research mathematicians note that, in the long run, the way we prepare secondary teachers will change and that the present methods of preparing teachers will give way to more emphasis on training the teachers, first as mathematicians, and secondarily, as teachers. Faculty at a university should then be mathematicians rather than specialists in secondary mathematics education. Some observers of the scene note that certification requirements will be changed, perhaps to reduce the current requirements for foundations courses, courses in methodology and supervision of student teaching. For example, the Carnegie Foundation has proposed that prospective teachers obtain a regular undergraduate major degree and that courses relating to teacher certification become a subsequent Master’s degree in a College of Education. If this were already the case, the proper strategy for us would be to replace the mathematics educators, as we now know them, with research mathematicians. Unfortunately, there is no clear indication that these changes will soon occur in Utah. The decisions to replace faculty are directly before us.

Unless a policy is soon adopted, the decision for the future will likely happen by default. Unless we can find viable mathematicians doing enough research in mathematics education to allow them to advance in rank, the department will hire the best research mathematicians available at a given time. Over the long run, given the presently known supply, the number of mathematics educators in the department will suffer attrition. If the department continues its commitment to the training of teachers, the research mathematicians will then have to pick up the responsibility of preparing secondary teachers, a task that they are unlikely to find appealing. If we cannot find mathematics educators who do credible research in mathematics education, the only other alternative seems to be to create a core of “lecturers” or “professional faculty” who will have teaching responsibility but who will not be required to do research.

Resources For the size of its task and responsibility, the department is undermanned. The PhD candidates that are coming into the department will help, but we have already been warned by external evaluators that we are expecting far more from our students for teaching than is customary in “good” universities and that we must protect their time for their own study. If funded positions were available, these might be reserved for postdocs or visiting faculty. Such a policy would bring a stimulating flow of ideas and energy to the department, while providing some modest teaching help. However, the positions might also be used for “instructor” level teachers in order to free more time for regular faculty to devote to research and citizenship activity.

If the department is to be the support to the rest of the university that it ought to be, it needs additional strength in numerical analysis and applied mathematics. It is primarily through these avenues that the department can reach out to the campus research community. Salaries for good numerical analysts are said to be very high (exceeding $100K), so there is an immediate problem of budget. It might be possible, however, to share the cost with another department if a candidate suitable to both could be found. G. S. Gill’s efforts this past year to establish an Applied Mathematics seminar is seen by many as good example of the way the Mathematics Department should provide mathematics leadership in the University. Gill has suggested that faculty with applied interests be clustered as space is allocated in the renovated building. There is also a need for some secretarial help and supplies if the seminar is to become a Center for Applied Mathematics.

Finally, the department has lagged behind the rest of the College in obtaining computing for faculty and students. We contemplate a need for considerable growth in the near future. As the computing resources move into the department, the faculty will join with much of the rest of the College in asking for staff support to maintain hardware and software.

NEW EXTERNAL GRANTS
James Cannon, one of eighteen principal investigators, Science and Research Center for Geometric Visualization at University of Minnesota, NSF.
James Cannon, SCREMS Computing Grant (with P. Bates).
Louis J. Chatterley and Douglas Garbe, grant awarded from Utah System of Higher Education for In-Service work with State Elementary Education Teachers. Total project: $24,815.
Gerald Myerson, Distribution of sequences, Australian Research Council.
Gerald Myerson, Norms and resultants (renewal), Australian Research Council.
Andrew Pollington, NSF Conference Grant, $8,000.
Andrew Pollington, SCREMS/NSF $40,000.

PROPOSALS SUBMITTED
Peter Bates, 2 to NSF, 1 to AFOSR, 1 to ONR.
Louis Chatterley and Douglas Garbe, to Utah State Board of Regents for Summer Workshops in Math for Middle/Elementary Schools, April 1991.
G. S. Gill, Apple Computer Inc., Computer Lab for teaching calculus.
Robert Speiser, NSF research.
Jacqueline Taylor-Ortega, to BYU Administration, Math Lab sustaining funds.
Ted Wight, NSF $5,000,000 State Systemic Initiative Proposal.

PROFESSIONAL LEAVES
Fall 1990: Ronald Jamison, Helaman R. P. Ferguson, Donald R. Snow

POST-DOCTORAL/RESEARCH ASSISTANTS
Post-Doctoral: Stephen A. DiPippo, Michael E. Lundquist, Andreas Stahel
Research Assistants: Xinyu Deng, Mohammad Omran, Blake Fordham, Eric Swenson, Jianping Xun, Ximing Zhou

PROFESSIONAL AWARDS


DEPARTMENT PERSONNEL
ORSON PRATT PROFESSOR: James W. Cannon
PROFESSORS: Roger Baker, Wayne W. Barrett (Leave), Peter W. Bates, Louis J. Chatterley (Assoc. Chair),
Peter L. Crawley, Lawrence Fearnley, Harvey J. Fletcher, Rodney W. Forcade, Lynn E. Garner,
Lang, Gary R. Lawlor, Hal G. Moore, John M. Peterson, Andrew D. Pollington, Donald W. Robinson
(Chair), William V. Smith, Donald R. Snow, Robert D. Speiser, Theodore A. Wight, David G. Wright.
ASSOCIATE PROFESSORS: Gerald M. Armstrong, Jasbir S. Chahal, Douglas G. Garbe, R. Vencil Skarda, L.
Kirk Tolman, Charles N. Walter, Jan E. Wynn.
ASSISTANT PROFESSORS: Stephen P. Humphries, Kening Lu, Gary R. Lawlor, Michael Lundquist.
EMERITI PROFESSORS: Robert G. Clawson, Burton C. Gee, Floyd E. Haupt, Kenneth L. Hillam, Kenneth
M. Larsen, Lloyd J. Olpin (Deceased, Fall 1991), Harry E. Wickes.
LECTURER: Jacqueline Taylor-Ortega.
ADMINISTRATIVE: Jan L. Peterson, Leri Dawn Smith.
STAFF: Jill Fielding, Gloria Larkin.

SCHOLARLY WRITING
TECHNICAL/CREATIVE BOOKS

INSTRUCTIONAL TEXTBOOKS, PUBLISHED BOOK REVIEWS, SPECIAL BOOKS:

SCHOLARLY AWARDS
Roger C. Baker, NSF grant of $30,000 p.a. for three years beginning 1 July 1992.
Peter W. Bates, NSF, Problem with Phase Transitions.
Louis J. Chatterley (Director), Douglas G. Garbe (Assistant Director), and Royal Hurd were granted an award by the State Board of Regents to hold summer workshops in Mathematics for Middle/Elementary School teachers to upgrade their mathematical knowledge and to complete Level I Endorsement level as specified by the State Board of Education. The workshops were conducted in June 1992 with 60 participants.
Kening Lu, NSF grant of $35,000 for two years beginning 1 June 1992.
Andrew Pollington, ARC grant to visit Australia and SERC grant to visit Imperial College.

PROFESSIONAL FELLOWSHIPS OR VISITING PROFESSORSHIPS
Jasbir S. Chahal, Guest Professor, March 1-June 30, 1992, University of Salzburg, Austria.
Kening Lu, NSF.
Andrew Pollington, Visiting Professor, Flinders University, Australia (Winter 1992) and Imperial College, London, England (Summer 1992).


COLLEGE SPRING RESEARCH CONFERENCE 1993 Spring Research Conference, Seventh Annual, Saturday, March 13, 8:30 a.m., Martin Building. Sponsored by Brigham Young University College of Physical and Mathematical Sciences and Central Utah Section of the American Chemical Society. (Session Chairs for the Math Department: James Cannon, Charles Walter.) The Department had 11 student presentations: John Robertson, Mohammad Omran, Frank Wilson, David Smith, Troy Goodsell, Matthew Curland, Jeff Liu, Cindy Deng, Melissa Kemmerle, Ping Xun, Paul Shawcroft.

PI MU EPSILON/STUDENT CHAPTER OF MAA Dr. Jan Wynn is the faculty advisor of these two student clubs, and they sponsor different activities through the semester:
Donald Snow, BYU, 20 October 1992, “How many ways can you ... ?”
Kirk Tolman, BYU, 5 November 1992, “Mysterious Matrices.”
Donald Snow, BYU, 18 February 1993, “A slick new way of getting the sums of the powers formulas.”
Kerry Wyckoff, BYU, 8 April1993, “The Catalan Numbers.”

WINTER ACTIVITY: Saturday, 6 March 1993, Aspen Grove (faculty, graduate students, math majors and members of the student chapter of MAA and Pi Mu Epsilon [and partners]) were invited to attend.
T.A. SEMINAR Denny Foscarini, a visiting math instructor, took over the position of Math 110/111 coordinator and as such was in charge of the TAs. The annual Mathematics T.A. Seminar was held 28 August 1992 from 9 a.m.-4 p.m. The schedule was as follows:

- **9:00** Welcome: Denny Foscarini, Math 110 Coordinator
- **9:10** Remarks: William Evenson, Dean, College of Phys. & Math Sciences
- **9:25** Remarks: Jean S. Taylor, Honor Code Asst. to the Dean of Student Life
- **10:00** Break
- **10:15** Remarks: David Wright, Graduate Coordinator
- **11:00** Remarks: Lou Chatterley
- **12:00** Lunch
- **1:00** Separate into teaching assignments; syllabi, videotapes, exams, etc.
- **2:00** Remarks: Roland E. Larson, Author, Math 110 textbook

SCIENCE DAY Science Day was held 31 October 1992. Dr. Kenneth Larsen was in charge. Classes were given by Charles Walter, Don Snow, Hal Moore and Gurcharan Gill. High school students throughout the state attended, most from Utah valley.

MATHEMATICS MAJORS

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The Department of Mathematics granted its first two PhD degrees this year: April 1993:

- Eric L. Swenson, Dissertation “Negatively Curved Groups and Related Topics” Advisor: James W. Cannon
- Jian Ping Xun, Dissertation “Metastable Patterns for the Cahn-Hilliard Equation” Advisor: Peter W. Bates

PROFESSIONAL DEVELOPMENT LEAVES

FALL AND WINTER SEMESTERS: William E. Lang, Robert D. Speiser, Andreas Stahel
WINTER SEMESTER: Louis J. Chatterley

MISSION PRESIDENTS: Gurcharan S. Gill (Winter), Ronald Jamison

GUEST SPEAKER PRESENTATIONS

COLLOQUIA

- David Wright, BYU, Sigma Xi Award Paper of the Month, “Contractible manifolds which are not covering spaces,” 26 October 1992.
• Keith Stroyan, Univ. of Iowa, “Calculus using Mathematica,” 3 December 1992.
• Chris Grant, Georgia Tech, “The Cahn-Hilliard equation from a dynamical systems perspective,” 22 February 1993, (Job Candidate).
• Kalaman Gyory, MSRI, “Diophantine results connected with discriminant and resultant,” 22 March 1993.
• Tom Hales, Univ. of Chicago, “Representation theory and hyperelliptic curves, 25 March 1993.
• Jaap Top, MSRI, “The diophantine equation $x^3 + y^3 = N$,” 5 April 1993.
• Paul Halmos, Santa Clara Univ., “I still don’t know the answers,” 12 April 1993.

OTHER

• Yu Su, from a computer software company in Salt Lake City, demonstrated 2-D and 3-D visualization using TechPlot, a data plotting and parameter estimation package for the PC, Thursday, 10 September 1992.
• Topology Seminar, Robert Myers, Oklahoma State, “Coverings of 3-manifolds,” 8 July 1993.

Faculty Publications and Major Accomplishments

Gerald M. Armstrong
Papers refereed: Measure spaces and division spaces, R. Henstock, Real Analysis Exchange
Scholarly presentations: Panel on Calculus Reform, MAA Conference, 9 April1993
Committee Work: Associate Chair, Graduate Coordinator, Executive Committee
Scholarly Awards: 2 NSF grants and 1 application

Roger C. Baker
Reviews for NSF, etc.: Julia Mueller, NSF proposal.
Scholarly Presentations: Sums of two squarefull numbers, University of Colorado, Boulder, April 1993; Primes of form [nc], University of Nancy, September 1992; A rather neglected sieve method, Brown University,
April 1993; How to improve a Rosser-Iwaniec sieve estimate, Northern Illinois University, AMS meeting, May 1993

Departmental and University Committee Work: Graduate Committee, Recruitment Committee


Scholarly Awards: Continuation of NSF grant

Wayne W. Barrett

Scholarly Presentations:

Departmental and University Committee Work: Mathematics Education Committee

Editor of Professional Journals: Associate Editor, Linear Algebra and its Applications, October 1992-


Peter W. Bates

Non Peer-Reviewed Publications:

Published Reviews: 4 for Mathematical Reviews
Reviews for NSF, etc.: 5 proposals (2 for Appl. Math, 2 for Classical Analysis, 1 for International)

Scholarly Presentations: Fudan University, Shanghai, August 1992; Peking University, Beijing, August 1992; Kunming, August 1992; Rome, December 1992; Fields Institute, January 1993; McMaster University Colloquium, January 1993; University of Edinburgh, April 1993; Heriot-Watt University, April 1993; Oberwolfach, May 1993; Vancouver, August 1993

Serving as editor or on editorial board: Member, editorial board, Electronic J. of Differential Equations

Department and University Committee Work: Department Chair; Chair, Executive Committee

Organizing Committee for Professional Meeting: Organizer SIAM Conference (400 participants), October 1992, Snowbird, Utah; Organizer, Conference on Nonlinear PDE’s and Dynamical Systems (over 40 participants), May 1-4, 1993, Snowbird, Utah

Scholarly Awards Received: NSF personal research, 1993-96. NATO award (with N. Alikakos and G. Fusco), 1993-96.

Professional fellowships or visiting professorships: Directorship of International Centre for Mathematical Sciences, UK, declined.

Other Types of Scholarly Output: 2 NSF proposals submitted, 2 ONR proposals submitted, NATO proposal submitted

Other Contributions: 1 Honors thesis supervised, 2 M.S. theses supervised, 1 PhD dissertation supervised, 2 non-thesis M.S. students advised. Member (with R. Milman, VP Cal State San Marcos, and G. Mullen, Penn State) of external committee to review graduate program, Dept. of Mathematics, UNL V.

James W. Cannon

Published Reviews: Some for Zentralblatt
Papers Refereed: 3
Reviews for NSF, etc.: 4

Scholarly Presentations: Colloquium, Florida State Univ., October 1992; Invited address, Florida State Univ.-Univ. of Florida, Joint Topology Conference, October 1992; Maeser Distinguished Faculty Lecture, BYU, February 1993; Nevanlinna Conference, Ann Arbor, Michigan, June 1993

Recognition for Teaching: MAA Award for Distinguished College or University Teaching of Mathematics, Intermountain Section.

Department and University Committee Work: Education Committee, Recruitment Committee
Scholarly Awards: Maeser Distinguished Faculty Lecturer; Individual NSF Grant; Member Geometry Center (NSF)

Other Contributions: Advisor to 4 PhD Students: Eric Freden, Blake Fordham, Paul Shawcroft and Eric Swenson (who completed his PhD in April 1993).

Jasbir S. Chahal
Reviews for Math Reviews: Stephen Humphries, Some subgroups of SL(S, 7l) generated by transvections

Louis J. Chatterley
Scholarly Presentations: Invited talks to West Des Moines, Iowa: one talk to an elementary school, one talk to a junior high school, two talks to a senior high school, February 1993.
Departmental and University Committee Work: Mathematics Education Committee, Graduate Committee, Student Recruitment Committee
Executive Officer Professional Organizations: Executive Board of the Utah Teachers of Mathematics organization, post high school representative (elected position).
Organizing Committee for Professional Meeting: Committee to plan 1993 meeting of the Utah Teachers of Mathematics, October 1993.
Scholarly Awards: Grant from State Board of Regents for three one-week workshops for inservice elementary teachers, June 1993.
Other contributions: Sterling scholar committee for mathematics; served on a state committee to select the outstanding Teachers in Utah to recommend for National recognition; Leave Winter 1993, working with Dr. Peck at the University of Utah.

Gregory R. Conner
Scholarly Presentations: 1992 Ohio State University Conference on Geometric Group Theory; Math Department Colloquium, Humboldt State University, December 1992
Departmental and University Committee Work: Graduate Recruitment Committee
Other Contributions: Departmental topology seminar participant; chair of a PhD dissertation defense (Eric Swenson); judge at the College Research Conference.

Peter L. Crawley
Departmental and University Committee Work: Executive Committee

Lawrence Fearnley
Papers Refereed: Pseudo-circles in dynamical systems, J. Kennedy, Transactions of the A.M.S.
Departmental and University Committee Work: Chair, Sabbatical Leave Committee
Other Contributions: Supervised M.S. student, Darrin Doud, The Method of Acyclic Models.

Rodney W. Forcade
Departmental and University Committee Work: Chair, Department Computer Committee; Member, College Computer Committee
Other Contributions: Supervisor (and back-up) of department system manager

Douglas G. Garbe
Scholarly Awards: Received 2nd grant from Utah State Board of Regents to conduct workshops for elementary school teachers, June 1993.
Other Scholarly Output: Organizing materials and administering exams to collect data for Mathematics Vocabulary Study comparing Native Americans and Anglos, Spring Term 1993. Data collecting finished, now analyzing data and writing report for article to be submitted to a refereed journal.

Lynn E. Garner
Departmental and University Committee Work: University Scholarship Committee; Departmental Transfer Evaluations; Department Teaching Committee; Chair, Department Planning/Goals Committee
Scholarly Awards: NSF Dissemination Grant, Harvard Calculus (with C. Walter, et al); Alcuin Fellow; Hewlett-Packard Equipment Grant, (with G. Stokes, et al); Course development grant, GE Precalculus (with C. Walter)
Other Contributions: HP National Educational Advisory Committee; HP Club Advisor; selected to participate in the annual reading and scoring of Advanced Placement Examinations in Mathematics, June 1993, Clemson, South Carolina

Gurcharan S. Gill

Richard A. Hansen
Departmental and University Committee Work: Department Undergraduate Committee

Stephen Humphries
Departmental and University Committee Work: Curriculum Committee; Chair, Colloquium Committee
Other Contributions: Talks in Topology/Group Theory Seminars

Ronald D. Jamison
Leave, serving as Mission President in the Dominican Republic, return July 1993

Jack W. Lamoreaux
Departmental and University Committee Work: Calculus Coordinator; Computer Committee

William E. Lang
Scholarly Presentations: One hour lecture, Math Sciences Research Institute, January 1993

Gary R. Lawlor
Recognition for Teaching: Appointed to “Panel of Visiting Lecturers” (MAA), purpose is to be a resource to colleges to give talks and discuss mathematics.
Departmental and University Committee Work: Math Education Committee
Other Scholarly Output: Applied for ONR grant

Kening Lu
Papers Refereed: J.D.D., 1; J.M.A.A. 1; J.D.E. 3; SIAM 2;
Reviews for NSF, etc.: 1 for NSF
Scholarly Presentations: Beijing, China, August 1992; Kungming, China, August 1992; University of Indiana, March 1993; Pacific Northwest Dynamical System Conference, Bellingham, Washington, April 1993; Beijing University, May 1993; Inst. of Academic Sinica, Chengdu Branch, May 1993; Sichuan Univ., June 1993; Chengdu Institute of Technology, June 1993; Zhejiong University, June 1993.
Departmental and University Committee Work: Curriculum Committee; Recruiting Committee
Scholarly Awards: NSF Grant, 1992-93

Michael Lundquist
Papers refereed: 2
Departmental and University Committee Work: Graduate Committee; Graduate Fellowship Committee (recruiting graduate students)
Other Contributions: Seminar on Representation Theory, Winter 1993

Hal G. Moore
Departmental and University Committee Work: Committee on Secondary Teaching, Intercollege Committee; Curriculum Committee

Tiancheng Ouyang
Departmental and University Committee Work: Organizer of PDE Seminar series, fall and winter semesters.

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Scholarly Presentations: PDE Seminar, Brigham Young University, November 1992; Nankai University, Tianjin, China, June 1993; Snowbird Conference on Nonlinear Partial Differential Equations and Dynamical Systems, May 1993; PDE Seminar at Math Institute, Academia Sinica, Beijing, China, June 1993.

John M. Peterson
Departmental and University Committee Work: Chair, Math Education Committee; Mathematics Education Coordinator

Andrew D. Pollington
Reviews for NSF, etc.: 1, NSERC
Department and University Committee Work: Chair, Curriculum Committee; Departmental Mission Statement Committee

Scholarly Awards Received: ARC, April/May 1993
Professional Fellowships: Visiting Professor, Flinders University, 1993; Visiting Professor, Imperial College, 1993
Other Contributions: Currently running seminar on Wavelets; includes students from C.S., Engineering and about 6 faculty.

Donald W. Robinson
Published Reviews: MR 92K: 15002; MR (Martin and Olazabal) to appear; MR (Prasad and Bapat) to appear; MR (Laffey and Meehan) to appear; MR (Bru, Canto and Tam) to appear
Papers Refereed: M (LAA) and revision; E-U (LAA); L&M (LAA) and revision; L-Y (Fib. Q); H (LAA); W (LAA); P&C (LAA); F&B (Fib. Q.); P-R (LAA); P (LAA)

Departmental and University Committee Work: Chair, Department Recruitment Committee

R. Vencil Skarda
Departmental and University Committee Work: Masters Exams; Sterling Judge; Putnam Exam Chair
Serving as Executive Officer: Utah Coordinator for MAA High School Exam

William V. Smith
Departmental and University Committee Work: Curriculum Committee; Graduate Committee; PhD Exams
Scholarly Awards: BYU Honors grant, Calculus development

Donald R. Snow
Scholarly Presentations: Using spreadsheets in undergraduate mathematics, Poster Session presentation, International Congress on Mathematical Education, Quebec, Canada, 17-23 August 1992; Harvard Calculus, International Congress on Mathematical Education, Quebec, Canada, 17-23 August 1992; What is the “Harvard Calculus?”, Panel Discussion, Department of Mathematics Colloquium, BYU, 11 September 1992; How many ways can you ... ?, Pi Mu Epsilon, Department of Mathematics, BYU, 27 October 1992; Recreational math on a computer, Intermountain High Schools Natural and Mathematical Sciences Conference, BYU, 31 October 1992; Sums of powers of general arithmetic sequences, American Math Society Annual Meeting, San Antonio, Texas, 13-16 January 1993; A slick new way of getting the sums of the powers formulas, Pi Mu Epsilon, Department of Mathematics, BYU, 18 February 1993; Mathematics and ways of knowing, Humanities Department Seminar, BYU, 1 March 1993; The minimum surface equation by equivalent problems, Partial Differential Equations Seminar, Department of Mathematics, BYU, 9 March 1993; Technology to use with Harvard Calculus, Utah Council on Computers in Education meeting, Hunter High School, West Valley City, Utah, 12-13 March 1993; A slick new way of getting the sums of the powers formulas and a lot more, Mathematical Association of America, Intermountain Section Meeting, University of Utah, 9-10 April 1993; A simple algorithm for the
formulas for the sums of the powers of the integers, Utah Academy of Sciences, Arts and Letters Meeting, Cedar City, Utah, 7 May 1993.

**Departmental and University Committee Work:** Advisor, Spring Research Conference; Advisor, Math Competition in Modeling; BYU representative, Rocky Mountain Math Consortium Board of Directors

**Executive Officer Professional Organizations:** Chairman, Intermountain Section of Mathematical Association of America.

**Robert D. Speiser**

**Scholarly Presentations:** MSRI, several lectures, Fall 1992; MIT and Cornell, February 1993; University of Stockholm, Sweden, Algebra Seminar, 19 April 1993; Politecnico di Torino, Spain, June 1993; University Complutense de Madrid, Spain, June 1993.

**Recognition for Teaching:** Alcuin award

**Professional Fellowships:** MSRI, October-December 1992

**Andreas Stahel**

**Papers Refereed:** J. Semigroup Theory, J. fur Angew. Mat.

**Scholarly Presentations:** Invited talk, Conference on ‘Semigroups of operators and applications,’ 10-14 August 1992; Colloquium talk, University of Zurich, 18 December 1992; Talk at the conference ‘Funktionalanalysis und nichtlineare partielle differentialgleichungen,’ Oberwolfach, 30 May, 5 June 1993.

**Other Contributions:** Currently on leave, teaching at the Ingenieurschule Biel, Switzerland.

**Jacqueline Taylor**

**Recognition for Teaching:** Alcuin award

**Departmental and University Committee Work:** Benson Scholarship committee; Freshman year committee; supervise Computer and Undergraduate Committee, Mathematics Dept.; SHINE committee; Presenter, University TA Conference; Executive Committee, Mathematics Dept.

**Other Contributions:** Assistant Chair, Mathematics Dept.; Coordinator, Pre-College Math; Consult with Math Lab

**L. Kirk Tolman**

**Departmental and University Committee Work:** Chair, Teaching Committee

**Charles N. Walter**

**Scholarly Presentations:** Panel on calculus reform, MAA Meeting, Salt Lake City, Utah, April 1993.

**Recognition for Teaching:** Student award for excellence in teaching, 1993; Alcuin Fellow 1993

**Departmental and University Committee Work:** Chair, Undergraduate Committee; College G.E. Committee; Freshman Orientation Committee, University

**Scholarly Awards:** NSF Grant (subcontract to Arizona) for dissemination and implementation of Harvard Consortium Calculus materials (with L. Garner, G. Armstrong, et al); Hewlett-Packard Grant for development of pre-engineering (pre-calculus) mathematics course (computer hardware), (with L. Gamer, G. Stokes, R. Forcade, J. Taylor); Faculty Center grant for precalculus GE course with computer augmentation (with L. Garner).

**Other Contributions:** Undergraduate Coordinator; Dissemination Workshop on Calculus Reform, BYU Conference Center, 29 June-2 July 1993, 25 participants; 1 of 10 invited participants from the United States to attend a Conference for Computers in Mathematics Education, jointly sponsored by NSF and the Mathematical Society of Mexico, July 1993, Mexico City, Mexico.

**Theodore A. Wight**

**Departmental and University Committee Work:** Pre-med committee member, appointed at request of President Lee; Computer and Teaching committees, Mathematics Dept.

**Other Scholarly Output:** Quality reviewer of textbooks for Nabisco computer based curriculum project.

**David G. Wright**

**Published reviews:** 1 for Math Reviews

**Papers Refereed:** 1 for Transactions of AMS.

**Reviews for NSF, etc:** 1 for NSF

**Scholarly Presentations:** Spring Topology Conference, March 1993, Columbia, South Carolina.

**Departmental and University Committee Work:** Department Executive Committee; Chair, Department Graduate Committee; College Advancement in Rank

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Scholarly Awards: Sigma Xi “Paper of the Month” award, October 1992
Other contributions: Nominated Jim Cannon for Maeser Distinguished Faculty Lecturer award

Jan E. Wynn
Scholarly Presentations: Report at the National Pi Mu Epsilon and Student Chapter of MAA combined meeting, January 1993
Departmental and University Committee Work: Department Undergraduate Committee
Other Contributions: Department faculty advisor for Pi Mu Epsilon and the Student Chapter of the MAA, organizing 3-4 functions per semester

VISITING FACULTY

Thomas G. Brady
Other Contributions: Doctoral Examination Committee, Eric Swenson.

Xinfu Chen


COLLEGE SPRING RESEARCH CONFERENCE 1994 Spring Research Conference, Eight Annual, Saturday, March 26, 8:30 a.m., Martin Building. Sponsored by Brigham Young University College of Physical and Mathematical Sciences and Central Utah Section of the American Chemical Society. (Session Chair for the Math Department: William E. Lang.) The Department had 8 student presentations: Susan Aydelotte, Frank Bria, Reynold Byers, Carl Gibbons, Paul Shawcroft, Hylie Thorpe, Neil Waite, Saule Zhoshina.

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PROFESSIONAL DEVELOPMENT LEAVES, FALL SEMESTER: Roger Baker

MISSION PRESIDENT: Gurcharan S. Gill

Faculty Publications and Major Accomplishments

Gerald M. Armstrong
Research: PI for two and co-PI for a third NSF grant.
Citizenship: Associate Department Chair; Graduate Coordinator; Executive Committee; Teaching Committee supervisor; Computer Committee supervisor
Two papers refereed, Tamkang Journal of Mathematics, Real Analysis Exchange

Roger C. Baker
Teaching: Professional Development Leave, Fall Semester 1993 (Institute for Advanced Study, Princeton).

**Citizenship:** Graduate committee; Editor, *London Mathematical Society* journals; Four papers refereed; Five grant proposals: Canadian Research Council, NSF, NSA; Four papers reviewed for *Math. Reviews*; Weekly seminar organized ‘Irregularities of distribution,’ Winter Semester 1994

**Wayne W. Barrett**

*Teaching:* Three Master’s students supervised: Frank Wilson, William Hyatt, David Huff. Committee member for 2 senior honor’s theses and 2 master’s theses.


**Citizenship:** Curriculum committee, undergraduate advisement committee. Associate Editor, *Linear Algebra and its Applications* (and Editor of a special issue honoring Miroslav Fiedler and Vlastimil Ptak). Three papers refereed; Outside reviewer for tenure and promotion for two faculty of other universities

**Peter W. Bates**

*Teaching:* Supervise two PhD students: Junping Shi and Chongchun Zeng; one M.S. thesis: Xinyu Deng; one M.S. project: Thomas Griboszki; committee member for M.S. student in M.E.: Andrew Roberts

*Invited Speaker:* AMS Special Session on Algebraic and Geometric Methods in Control Theory, Vancouver, British Columbia, August 1993; University of North Texas, October 1993; AMS Special Session on Reaction-Diffusion Systems, College Station, Texas, October 1993; Texas A&M University, October 1993; University of Tennessee, Knoxville, November 1993; Georgia Tech, November 1993; University of Minnesota, December 1993; Macquarie University, Sydney, April 1994; University of Sydney, April 1994; University of New South Wales, April 1994; Conference on singular perturbations, Oberwohlfach, Germany, May 1994; Conference on motion by mean curvature, Levico, Terme, Italy, June 1994; International conference on nonlinear dynamics and pattern formation in the natural environment, Noordwijk, Holland, July 1994; Interface motion in multicomponent media, July 1994. Three research proposals submitted; one three-year grant from NSF award; one three-year travel grant from NATO awarded.


**Thomas G. Brady**


**Citizenship:** Undergraduate Advisement Committee

**James W. Cannon**

*Teaching:* Supervisor of three PhD students (two are graduating in August 1994).

*Invited talks:* Workshop on computer methods in geometric group theory, Minneapolis, Minnesota, January 1994; Colloquium and seminar, Virginia Tech, February 1994; Conference on low dimensional methods (in geometry and group theory), Lyon, France, July 1994; Personal continuing grant, NSF.

**Citizenship:** Graduate committee; Elected as Trustee at MSRI. Evaluated 4 NSF proposals; Three papers refereed. Reviews for *Mathematische Zeitschrift.* Weedly topology-group theory seminar

**Jasbir S. Chahal**

*Teaching:* Senior Honor’s Thesis: Keri McEntire

**Citizenship:** Teaching Committee; Undergraduate Advisement Committee

**Louis J. Chatterley**

*Teaching:* Supervised student teachers


Citizenship: Chair, Mathematics Education Committee; Member of University Secondary Partnership Committee; Member of faculty group to study the university elementary teaching program; Executive Board of the Utah Teachers of Mathematics Council (UCTM), Post High School representative (elected position); Committee to plan 1994 meeting of the Utah Teachers of Mathematics, to be held November 1994; Committee to plan 1997 Regional Conference of the NCTM in Salt Lake City.

David Clark
Teaching: Participated in the Teaching Partnership Program with Donald Robinson and Paul Shawcroft. Attended each other’s classes and had discussions on ways to improve and develop teaching abilities.

Citizenship: Undergraduate Committee. Took part in the New Faculty Seminar offered bi-weekly by the Faculty Center, Fall Semester.

Gregory R. Conner
Teaching: Chair of Eric Swenson’s PhD defense committee; Member of Paul Shawcroft’s PhD committee; Faculty advisor for PhD student, Saule Zhoshina; Math 190 course development with C. Walter; Member of Teaching Trios (BYU Pilot Teaching Partnership Program) with C. Walter and S. Zhoshina.


Citizenship: College Computer Committee; Department Computer Committee; Graduate Recruitment Committee; Gave several talks in the weekly topology seminar; Judge at the Spring Research Conference

Peter L. Crawley
Citizenship: Executive Committee

Lawrence Fearnley
Citizenship: Have arranged talks for the topology seminar (Geometric/analytic series) every Tuesday.

Rodney W. Forcade
Citizenship: Computer Committee

Douglas G. Garbe

Research: In cooperation with Louis Chatterley a grant of approximately $20,000 from the Utah State Board of Regents has been received for the third year in a row for a project named SWIMMER. This project is to conduct three workshops in mathematics, each of one week in length, for elementary and middle school teachers. At least 60 teachers from nearby school districts participate.

Citizenship: Recruitment Committee; Teaching Committee
Lynn E. Garner

Teaching: Presenter at a workshop, MAA Minicourse on the HP 48, Cincinnati, January 1994. Advisor to two graduate students. Participant in Pilot Teaching Partnership Program partially sponsored by the Faculty Center.


Citizenship: Undergraduate Committee; Transfer Credit Evaluation; Advisor to campus HP Club

Gurcharan S. Gill

On leave serving as mission president, India

Christopher P. Grant

Teaching: Participant in Pilot Teaching Partnership Program partially sponsored by Faculty Center. Chair of advisory committee for Shane Brewer. Chair of examination committees for Xinyu Deng and Neil Waite. Member of Honors committee for Andrew Zmolek.


Citizenship: Curriculum Committee; Co-organizer of the Conference on Differential Equations and Dynamical Systems, held at BYU on 8 January 1994; Refereed papers for Journal of Differential Equations and for Proceedings of the Conference on Chaotic Numerics; Presented talks on own work and work of others in the weekly PDE seminar; Judge for 1994 Spring Research Conference; Participant in 1993 Professional Development Seminar sponsored by Faculty Center.

Stephen Humphries

Teaching: Member of exam committee for Blake Fordham and Eric Freden for PhD qualifiers.

Research: Grant submission to the NSF, Fall1993.

Citizenship: Math Department Colloquium Chair; Department library representative; Refereed one paper for Linear and Multilinear Algebra; Presented a few talks in the weekly topology seminar

Ronald D. Jamison

Citizenship: Chair, Teaching Committee

Jack W. Lamoreaux

Citizenship: Computer Committee

William E. Lang

Citizenship: Chair, Faculty Leaves Committee; Department coordinator, Spring Research Conference; Member, College Committee on Continuing Status and Rank Advancement; Refereed one paper for Journal of Algebraic Geometry; Co-organizer, Algebra Seminar; Two colloquium talks on Fermat’s last theorem, BYU Math Dept.

Gary R. Lawlor

Teaching: Student award for mathematics teacher of the year

Invited talks: Gave talk on slicing and the brachistochrone at Washington and Lee University and at the University of Richmond, Virginia, March 1994.

Citizenship: Teaching Committee; Undergraduate Advisement Committee

Kening Lu

Teaching: Master’s student supervised: Qing Chang; Senior honor’s thesis supervised: Andrew Zmolek

Invited talks: Georgia Institute of Tech., November 1993; BYU-Utah-USU PDE Conference, January 1994; NSF individual research grant awarded; BYU Young Scholar Award, 1993; Nominated for a Sloan Research Fellowship and for an NSF Young Investigator Award

Citizenship: Graduate Committee; Seven papers refereed: JDE, SIAM, Diff. and Int. Eqs, Proceedings of the Conference on Evolution Equations; One proposal reviewed for NSF; Gave lectures in weekly PDE seminars and attended colloquiums

Michael Lundquist


Research: One proposal submitted to NSF: Topics in combinatorial matrix theory.
Citizenship: Education Committee; Undergraduate Curriculum Committee; Graduate Committee; Two papers refereed for *Linear Algebra and its Applications*

**Hal G. Moore**
Teaching: Math 110 Coordinator; Supervisor to two master’s students: Reynold Byers and Frank Bria
Citizenship: Department Graduate Committee; University search committee for Dean of the College of Physical and Mathematical Sciences

**Tiancheng Ouyang**
Citizenship: Recruitment Committee; Undergraduate Committee; Gave talks in the weekly PDE Seminar and attended colloquia

**John M. Peterson**
Teaching: Nominated by students for the Karl G. Maeser Outstanding Teaching Award
Citizenship: Mathematics Education Coordinator; Mathematics Education Graduate Coordinator; Refereed three papers for *The Mathematics Teacher*; Present annual mathematics workshops for Nebo elementary teachers (unpaid)

**Andrew D. Pollington**
Invited talks: Bordeaux: Journees Arithmetique, September 1993; West Coast Number Theory meeting, December 1993; Co-organizer and presenter in weekly number theory seminars; Co-organizer and presenter in joint CS/Math Wavelets seminar; students and faculty from CS, Math, Physics and EE.
Projects: Can wavelets be used to give a cheap signal analysis for hearing model? (with Chabries). Image processing method with data security (with John Higgins)
Citizenship: Chair of Curriculum Committee: comprehensive review and revision of undergraduate curriculum

**Donald W. Robinson**
Teaching: Supervision of MS thesis: Neil Waite; Participation in the Pilot Teaching Partnership Program
Research: Recipient of the Karl G. Maeser, Research and Creative Arts Award
Colloquium Lecture, College of Physical and Mathematical Sciences
Citizenship: Chair, Department Recruitment Committee; Assistant Editor, *Fibonacci Quarterly*; Referee for eight papers: *LAA, FQ*; Seven reviews for *Mathematical Reviews*; Department colloquium lecture

**R. Vencil Skarda**
Citizenship: Graduate Committee; Teaching Committee; Putnam Team Advisor (placed 35th nationally this year); MAA Utah Regional Examination Coordinator for American High School Mathematics Examination

**William V. Smith**
Citizenship: Curriculum Committee; Graduate Committee--PhD exams supervisor

**Donald R. Snow**
Teaching: Advisor of undergraduate honors student: Carl Gibbons; Instructor at two NSF-funded workshops in Mexico on technology in math teaching, August and December 1993; Talk on teaching presented at High School Science Day, BYU, September 1993; Talk on teaching presented at the Utah Technology Conference, West Jordan High School, March 1994
Invited talks: Mexico City, August 1993; Vancouver, BC, August 1993; Merida, Yucatan, Mexico, December 1993; Cincinnati, Ohio, January 1994; Westminster College, Salt Lake City, April 1994; Minneapolis, August 1994.
Citizenship: Chair of Intermountain Section of MAA, 1994-1996; Board of Directors of Rocky Mountain Math Consortium--on visiting lecturer committee; Lecturer for MAA; Two papers refereed

**Robert D. Speiser**
Teaching: Collaborated with Paul Cox, Julie Boerio-Goates and Russ Osguthorpe on an NSF proposal to develop and implement new models for collaborative preservice and inservice math and science teacher
training, over the next several years. Funded for about $90,000 the first year. Working with Herb Clemens and others at the U. of Utah, collaborating with teachers of the Longview School in Murray.

Research: Grant submission to NSF, algebraic geometry
Citizenship: Undergraduate Committee; Mathematics Education Committee; Reviewer for Zentralblatt; Refereed two NSF proposals

Jacqueline Taylor
Teaching: Presented three workshops for 16 T As to train in teaching roles
Research: Participated as a consultant for an NSF grant proposed submitted by Herb Clemens of the University of Utah for the purpose of teacher development in elementary school mathematics through teacher partnerships. Participated as a consultant for an NSF grant proposal submitted by Juliana Boerio-Goates, Robert Speiser, Paul Cox and Russell Osguthorpe for the purpose of bringing hands-on science and mathematics into teacher development through school partnerships. Funded. Grant submission to NSF
Citizenship: Assistant Department Chair; Executive Committee; monitor Undergraduate Committee; University Freshman Year Experience Committee

Charles N. Walter
Teaching: Supervisor of M.S. student: Sue Fredette; Supervisor of Honor’s thesis student: Hylie Thorpe; Curriculum development for Math 190; Curriculum development for Math 112, 113 reform calculus
Research: Workshop funded by NSF for the dissemination of materials, ideas, curriculum of Harvard Calculus reform project. Four-day workshop in July 1994 (40 participants). NSF grant for Calculus reform Grant from General Education BYU for calculus reform. Grant submission to NSF
Citizenship: Curriculum Committee; Undergraduate Coordinator; Student Advisor; University New Student Orientation Committee

Theodore A. Wight
Research: Proposal submitted to Governor’s office for training secondary teachers
Citizenship: Teaching Committee; Student Advisement Committee

Steven R. Williams
Teaching: Served on Master’s committee for Frank Wilson; exam committee for Rod Lowry; Assisted Hylie Thorpe with Senior Honors Thesis
Citizenship: Mathematics Education Committee; Curriculum Committee; Refereed papers for Research in Collegiate Mathematics Education, Journal for Research in Mathematics Education; Reviewed proposals for 1993 and 1994 meetings of the International Group for the Psychology of Mathematics Education (PME) and North American affiliates of PME.

David G. Wright
Teaching: M.S. students supervised: Troy Goodsell, Denise Halverson, Jan Humphries
Research: Grant proposal submitted to NSF; $500 grant received from NSF for travel to CBMS Conference in Knoxville, TN, May 1994.
Invited Talk: Special session on high dimensional topology, January 1994 AMS meeting in Cincinnati, Ohio.
Citizenship: Executive Committee; Graduate Committee Chair; Organizer of Western Topology Workshop in Park City, June 23-25 1994; Participant in weekly geometric topology seminar; Participant in short seminars with Dennis Tolley (Statistics) and John Higgins (Computer Science)
Jan E. Wynn  
*Teaching:* Advisor to PhD student: Gerald Gribble, and two M.S. students; Advisor to thirteen undergraduate mathematics education majors  
*Research:* Working with the reform calculus group which uses *Mathematica.* Under a grant from NSF.  
*Citizenship:* Teaching Committee

**From the Annual Report of 1994–1995**

**FACULTY**  
**ORSON PRATT PROFESSOR:** James W. Cannon  
**ASSOCIATE PROFESSORS:** Gerald M. Armstrong, Jasbir S. Chahal, Douglas G. Garbe, Stephen P. Humphries, Kening Lu, R. Vencil Skarda, L. Kirk Tolman, Charles N. Walter, Jan E. Wynn  
**ASSISTANT PROFESSORS:** Thomas Brady, David Clark, Gregory R. Conner, Christopher P. Grant, Gary R. Lawlor, Michael Lundquist, Steven McKay, Tiancheng Ouyang, Steven R. Williams  
**ASSOCIATE TEACHING PROFESSOR:** Jacqueline Taylor

**SCHOLARLY WRITING**

**Chapters in Books and Reviews**  

**GRADUATE STUDENT THESES AND DISSERTATIONS**

**APRIL 1994**  
**M.S. (Thesis)**  
Reynold Elias Byers, “P.I. Algebras and Kaplansky’s Theorem”; *Major Professor: Hal Moore*  
Qing Chang, “Bifurcation Phenomena Study of the Steady-State Problem of CahnHilliard Equation”; *Major Professor: Kening Lu*  
Xinyu Deng, “A Numerical Analysis Approach for Hele-Shaw Problem”; *Major Professor: Peter Bates*  
Neil Anthony Waite, Thesis “Group Inverses and Companion Matrices”; *Major Professor: Don Robinson*  

**M.S. (Non-Thesis)**  
Denise M. Halverson, “The Homogeneous Property of the Hilbert Cube”; *Major Professor: David Wright*  
David James Huff, “Elliptic Matrices with Zero Diagonal”; *Major Professor: Wayne Barrett*  
William Joseph Hyatt, “Some Aspects of the Hopfield Neural Network”; *Major Professor: Wayne Barrett*  
Jan Lyn Pitts, “Proof of the Seifert and Van Kampen Theorem Using Covering Spaces” *Major Professor: David Wright*  
Frank Carter Wilson, “The Null Vector of a Distinguished Sub Matrix of the Matrix Redheffer” *Major Professor: Wayne Barrett*  

**M.A. (Thesis)**  

**M.A. (Non-Thesis)**  
Brian D. Morrow, *Major Professor: John Peterson*  
David Paul Goldberg Westwood, *Major Professor: John Peterson*
AUGUST 1994

PhD
Eric M. Freden, Dissertation “Negative Curved Groups Have the Convergence Property” Major Professor: James Cannon
Paul Howard Shawcroft, Dissertation “Algorithmic Methods in Combinatorial Group Theory” Major Professor: James Cannon

M.S. (Non-Thesis)
Darrell Gordon Johnson, “Matrix Differential Equations and Stability” Major Professor: Wayne Barrett
Andrew Perry Shull, “Division of anN-Polygon into Simplices to Achieve Unique, Quasi-Barycentric Coordinates”; Major Professor: Gary Lawlor/

M.A. (Non-Thesis)
Tana Jo Beckstrand, Major Professor: John Peterson
Ross Charles Decker, Major Professor: John Peterson
Paul Beaubeaux Mills, Major Professor: John Peterson

UNDERGRADUATE HONORS THESIS GRADUATES

August 1994

GUEST SPEAKER PRESENTATIONS

COLLOQUIUM SPEAKERS
Blake Peterson, Oregon State University, “Are we teaching with the correct models and modeling with the correct teaching?” 25 August 1994.
Nick Gilbert, University of Durham, “Which groups are knot like groups?” 6 September 1994.


OTHER SEMINAR SPEAKERS


CONFERENCES ORGANIZED
Conference on Differential Equations and Dynamical Systems, Brigham Young University, Utah State University, University of Utah, 8 January 1994, BYU, Provo, Utah. Organized by Christopher Grant and Tiancheng Ouyang.


Fall 1994 Wasatch Topology Conference, hosted by the University of Utah and Brigham Young University Mathematics Departments and held at Park City, Utah, 11-12 November 1994. Organized by Mladen Bestvina of the University of Utah and Greg Conner of Brigham Young University. Twenty-nine mathematicians in attendance.

AWARDS AND HONORS
Wayne Barrett, September 1994, Bluekey/BYUSA Professor of the Year.
Wayne Barrett, April 1995, Award for Distinguished College or University Teaching of Mathematics, The Intermountain Section of the Mathematical Association of America.
Louis Chatterley, Outstanding Teaching Award from Continuing Education.
Vencil Skarda, coach of the Putnam Team, which placed 27th nationally.

DEPARTMENT INFORMATION

MATHEMATICS MAJORS

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<th>Undergraduate Majors</th>
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From the Annual Report for 1995–1996

SCHOLARLY WRITING

PUBLISHED BOOK REVIEWS
SCHOLARLY PRESENTATIONS

Roger Baker: 3  Lynn Garner: 1  Steven McKay: 1
Wayne Barrett: 1  Chris Grant: 2  Tientcheng Ouyang: 4
Peter W. Bates: 19  Steve Humphries: 1  Andy Pollington: 3
Thomas Brady: 1  Bill Lang: 1  Donald Robinson: 1
Jim Cannon: 5  Gary Lawlor: 1  Don Snow: 7
Greg Conner: 2  Kening Lu: 5  Steven Williams: 2
Rod Forcade: 2  Mike Lundquist: 2

EDITORSHIPS

Wayne Barrett, Associate Editor, Linear Algebra and its Applications.
Wayne Barrett, Editor (with Angelika Bunse-Gerstner and Nicholas Young), Special Issue of Linear Algebra and its Applications honoring Miroslav Fredler and Vlastimil Pudl, Volumes 223/224, July 1995, 746 pages.
Peter Bates, Editor, Electronic J. Differential Equations.
Donald Robinson, Associate Editor, Fibonacci Quarterly.

RESEARCH AND CREATIVE ACTIVITIES FUNDING

Gerald Armstrong, last year of three NSF grants.
Roger Baker, $40,000 grant from N.S.A.
Peter Bates, NSF grant, NATO travel grant (with G. Fusco and N. Alikakos), $11,000. Subsistence award as senior visitor, Isaac Newton Institute, University of Cambridge, Fall 1995.
James Cannon, NSF grant.
Lou Chatterley and Doug Garbe, SWIMMER Project (3 weeks), Spring 1995, for elementary and middle school public school teachers. Funded by Utah State Board of Regents.
Chris Grant, Non-convex energies and dynamical metastability, Award No. 9501060, National Science Foundation, Division of Mathematical Sciences, Applied Mathematics Program, June 1995-May 1998.
Kening Lu, National Science Foundation, 1994-1996.
Bob Speiser and Charles Walter, $19,000 from the BYU Faculty Center for mathematics education research equipment and materials.

GRADUATE STUDENT THESIS AND DISSERTATIONS

APRIL 1995

M.S. (Thesis)

M.S. (Non-Thesis)
David Shane Brewer, “Analysis of the Fast Wavelet Transform as applied to Certain Finite Difference Matrices” Advisor: Chris Grant/ Andy Pollington
Eric Dwain Stemmons, “The SIR Epidemic Model” Advisor: David Wright
Candace Jean Osgood Wignall Advisor: John Peterson

M.A. (Thesis)

PhD
S. Blake Fordham, “Minimal Length Elements of Thompson’s Group F” Advisor: Jim Cannon

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AUGUST 1995

M.S. (Thesis)
Susan Renee McFarland Aydelotte, “The Symmetrized Graph and the Generalized Laplacian Spectra of Graphs” Advisor: Mike Lundquist
Hylie T. Barton, “The Authority of Answer Keys and Student Discourse: Shedding New Light on the Role of Students’ Notions of Understanding” Advisor: Steve Williams
Thilagavathi Murugesan, “The Moore-Penrose Inverse of Companion Matrices” Advisor: Don Robinson

M.S. (Non-Thesis)
Jeffrey Scott Anderson, “Evolutionary Dynamics of Iterated, Limited-Memory, Symmetric 2-Player Games over Discrete Strategy Spaces” Advisor: Jan Wynn
Keri Lynn Anderson, “Covering and Imbedding Theorems” Advisor: Lawrence Fearnley
Ann Andrist, “Freudenthal Compactification” Advisor: Roger Baker
Jan McDonald Thomson, “Growth Polynomials for Symmetric Groups” Advisor: Steve Humphries

M.A. (Thesis)
Rachel Lea Clay, “The Thought Processes of Students with High Mathematical Anxiety: The Casual Determinants” Advisor: Jan Wynn

M.A. (Non-Thesis)
Gregory C. Beveridge; Advisor: John Peterson
Kenneth David Reeves; Advisor: John Peterson
Wilford Mueller; Advisor: John Peterson

FACULTY INFORMATION

WINTER 1995
Faculty On Leave: Rodney Forcade, David Wright.
Part-Time Faculty, Robert Clawson, Harvey J. Fletcher, Duane Young.

FALL 1995
Part-Time Faculty: Bill Earl, Harvey J. Fletcher, Kenneth L. Hillam, Ted Wight

RETIREMENTS: Hal Moore (30 June 1995)

No new faculty joined us winter semester. We have had visiting faculty who joined us in the fall and are continuing. Ken Hillam and Harvey Fletcher, emeriti faculty, are part-time instructors; Bill Earl continues, helping with student teaching supervision and teaching one course. Jan Peterson, our systems manager, left the department in February, pursuing another employment opportunity. Jim Logan, who had previously been with the Computer Science Department, joined the department in that capacity.

MATHEMATICS MAJORS
UNDERGRADUATE MAJORS Bachelor of Science 186; Bachelor of Arts 227; Total 413.

GRADUATE MAJORS
PhD 12; Master of Science 19; Master of Arts 13; and Master of Arts-Education 28; Total 72

RESEARCH CONFERENCE
The 9th Annual Spring Research Conference was held on 25 March 1995. This is sponsored by Brigham Young University College of Physical and Mathematical Sciences, and Central Utah Section of the American Chemical Society. We had twelve students participate:

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Jeff Anderson, “Graph-Theoretical Determination of an Upper Bound for Candidate Peptide Sequences Assembled from Overlapping Fragments.”

Keri Anderson, “Some Remarks on the RSA Public Key Cryptosystem.”

Susan Aydelotte, “The Laplacian Spectra of Symmetrized Graphs.”

Katherine Baldwin, “Using Wavelets to Analyze Transient Sounds.”

S. Blake Fordham, “Minimal Length Elements of Thompson’s Group $F$.”


Alison Mueller and Brian Zwahlen, “Ancient American Mathematics.”


Mohammad Othman Omran, “The Real Positive Semidefinite Completion Problem for Nonchordal Graphs.”

Junping Shi, “Dynamics of Lorenz Equations.”

Eric Stemmons, “The SIR Epidemic Model.”

Chongchun Zeng, “Persistence of an invariant manifold of equilibria for a semiflow with symmetry.”

William E. Lang was the session chair and judges for the department were Chris Grant and Greg Conner. Junping Shi and Blake Fordham were the recipients of the prize for best presentation.

**PROFESSIONAL DEVELOPMENT LEAVES**

David Wright and Rodney Forcade spent the academic year 1994-95 on sabbatical. They had stimulating and productive years and returned in the spring of 1995 rejuvenated. Following are their reports:

**David Wright**, University of Utah (Fall 1994--Winter 1995)
I am working at the University of Utah with Professors Mladen Bestvina and Steve Gersten. I have run a seminar with Mladen Bestvina and visiting Professor Mark Feighn (Rutgers) on work of Ross Geoghegan and Michael Mihalik on the fundamental group at infinity. I have written a joint paper with Professor Fred Tinsley of Colorado College which has been submitted to *Transactions of the American Mathematical Society*. I have attended the lectures of Steve Gersten on cohomology of groups. I have attended the Max Dehn Seminar.

**Rodney Forcade**, Supercomputing Research Center (Fall 1994--Winter 1995)
I am spending a year at Supercomputing Research Center, working on Cayley tiles and lattice tilings with Jennifer Zito and Charles Fidducia, which work has already led to a joint paper presented at an AMS meeting special session. We are working on two more papers, one of which will be primarily computational. I am also working with Helaman Ferguson (a collaboration which has been successful in the past) on a longer term project—to be continued after I return to BYU. In between these collaborations, I have found time to partially solve an old tiling problem which has haunted me for more than half a decade—leading to a new algorithm and (I hope) a more theoretically “interesting” paper.

**From the Annual Report of 1996–1997**

**Tenure-Track Faculty**: Tyler Jarvis, Blake Peterson

**Faculty On Leave**: David Clark, Lawrence Fearnley, Richard Hansen, Jacqueline Taylor

**Part-Time Faculty**: Louis Chatterley, Bill Earl, Harvey Fletcher, Hal Moore, Ted Wight, Nora Hess

**Departed Faculty**: Tom Brady.

Two new tenure-track faculty joined us this fall as assistant professors. Tyler Jarvis received his PhD from Princeton University in 1994 and was an assistant professor at Mississippi State University. Tyler’s specialty is Algebraic Geometry. Blake Peterson received his PhD from Washington State University in 1993 and was an assistant professor at Oregon State University. Blake’s specialty is Mathematics Education.

**RETIREMENTS**: Louis Chatterley (1 September 1996)
MATHEMATICS MAJORS

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STUDENT AWARDS

Dmitri Kouksov received a Graduate Research Fellowship Award. An awards program was held in April to honor winners of the Spring Research Conference and other outstanding mathematics majors. Each recipient was awarded a cash prize.

TA Teaching Award: Sue Parkin, Nancy Woller, Tom Draper

Outstanding Senior Award: B.S. Tracy Halt Tyler Sundrud; B.A. Marisa Hills, Matia Marcucci

Also at this time, the College Council awarded to Steven Williams the Department Faculty Teaching Award, voted on by senior mathematics majors.


SCHOLARLY WRITING

CHAPTERS IN BOOKS AND REVIEWS


PUBLICATIONS IN CRITICALLY REVIEWED SCHOLARLY JOURNALS


EDITORSHIPS

Wayne Barrett, Associate Editor, Linear Algebra and its Applications.


Blake Peterson, Associate Editor, School Science and Mathematics.


Charles Walter, Contributing Editor, Journal of Mathematical Behavior.

Steve Williams, Editorial Board, Journal for Research in Mathematics Education (JRME).

GRADUATE STUDENT THESES AND DISSERTATIONS

APRIL 1997

M.A. (Thesis): Tara Loraine Lewis, “Five women build a number representation system,”, Charles Walter, advisor

AUGUST 1997


M.A. in Mathematics Education: Dennis Winfield Dalton, David Wright, advisor

PhD Degrees
Troy Larry Goodsell, “Projections of Compacta in Rn”; David Wright, advisor
Mohammad “Othman” Omran, “The real positive semidefinite completion problem for two unspecified entries”, Wayne Barrett, advisor
Chongchun Zeng, “Normally hyperbolic invariant tori manifolds and invariant foliations for semiflow in Banach spaces”, Peter Bates, advisor

DECEMBER 1997


NEW AND VISITING FACULTY/LEAVES

WINTER 1998
Tenure-Track Faculty: Shue-Sum Chow
Part-Time Faculty: Bill Earl, Hal Moore, Grant Peterson, David Tovey
Faculty On Leave: Jim Cannon, Kening Lu, Andy Pollington

Chow joined the faculty in a tenure-track position winter semester. Arino visited for winter semester; the rest of the visiting faculty joined fall semester and are continuing the academic year. Earl and Tovey are teaching one course and supervising student teachers. Moore, an emeritus faculty member, is teaching one course. Peterson, from the School of Accountancy, is on loan to us, teaching a calculus section. Vaintrob was here on a research appointment. Bessey was on a teaching appointment, and took a graduate course. The other three collaborated with faculty in research and also taught one class.

FALL 1998
Faculty On Leave: Tiancheng Ouyang
Faculty On Tenure-Track: David Cardon, Eric Swenson
Part-Time Faculty: Peter Crawley, Bill Earl, Larry Kimball, Grant Peterson, David Tovey.

David Cardon joined us this fall in a tenure-track position. His specialty is number theory. Eric Swenson was promoted to a tenure-track position. His specialty is topology. We had several visiting faculty visit us this semester. Crosland and Schwartz join us as part of the visiting high school program. Schwartz was teaching at a high school in Salt Lake and Crosland is taking a leave from Timpview High school and is working towards gaining her MA degree. Daners, Glasgow, and Higgins are finishing the 2nd year of their 2-year appointments. Gray and Pierce joined us for fall semester. Gray, a Professor at the University of Minnesota, is a prestigious LDS mathematician whom we were very fortunate to have for a visit. Pierce was an adjunct faculty member and concentrated solely on research for the semester (with Wayne Barrett). Deshpande, Goodsell, Howard and Wang joined us for one-year appointments. Howard works with the mathematics education courses and Wang was a post-doc in the Nonlinear Analysis Lab.

Bill Earl continues, teaching one class and supervising student teachers. Tovey and Kimball also joined us in that capacity. Peterson is still on loan to us from the Administration--he’s currently a faculty member in the
School of Accountancy. Crawley, an emeriti faculty member, is teaching two courses, as part of an early retirement agreement.

Tiancheng Ouyang is on leave for the academic year 1998-1999.


**TERMINATIONS:** Michael E. Lundquist (1 July 1998), John Peterson (30 June 1998)

**MATHEMATICS MAJORS**

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**PUTNAM TEAM**

Vencel Skarda is the faculty advisor for our Putnam team which competes annually, in December. The team has traditionally placed very well. The participants for 1998 were: David Andrist, Phillip Cook, Craig Edwards, Chou Han, and Adam Peterson

**STUDENT AWARDS**

We were informed in March 1998 that Chongchun Zeng received the Sigma Xi Best PhD Dissertation prize for 1997. His advisor is Peter Bates.

The Department held the 2nd Annual Pi-Mile Fun Run in April, which was a rousing success. Many graduate students, mathematics majors, faculty and staff joined in a fun run/walk, barbecue and games. Awards were also presented for the spring research conference winners, and teaching performance.

**GRADUATE DEGREES**

**APRIL 1998:**

**M.A.**

| Timothy Dolbin | Teaching position; high school in SLC |
| Mary Dunn      | Teaching position; high school in Orem |

**M.S.**

| Colin Brinkerhoff | Part-time teaching: BYU and UVSC |
| Vicki Herbst Kim  | High school in California |
| David Russell     |                             |
| Kristin Taylor    | Capital America Client Services; Dallas, Texas |
| Bryan Wise        |                             |

**AUGUST 1998**

**M.A.**

| Robert Farnsworth | Teaching position; high school in southern Utah |
| Aminda Gonzales   | Homemaker |
| Carole Sullivan   | Teaching position; UVSC |

**M.S.**

| KaraLynne Cook    | BenLife Insurance Company, Provo |
| H. Tracy Hall     | PhD: University of California, Berkeley |
| Jason Haroldsen   |                             |

**PhD**

| Dmitri Kuksov     | Business School: Univ. of California, Berkeley |
| Junping Shi       | Faculty position: Mathematics, Tulane University |
DECEMBER 1998
PhD
Andreas Weingartner Faculty position: Southern Utah University

OTHER SIGNIFICANT ITEMS

TEACHING AWARD
Gary Lawlor and Jim Cannon were the recipients of the 1998 Student Award for Excellence in Teaching.

UNIVERSITY COMMITTEES
Gerald Armstrong, Hinckley scholarship committee; Lynn Garner, Chair, Faculty GE Council.

LIST OF FACULTY
ORSON PRATT PROFESSOR: James W. Cannon
ASSISTANT PROFESSORS: David Cardon, David Clark, Gregory R. Conner, Tyler J. Jarvis, Steven McKay, Blake E. Peterson, Eric L. Swenson
ASSOCIATE TEACHING PROFESSOR: Jacqueline Taylor

Scholarly WRITING

CHAPTERS IN BOOKS AND REVIEWS


PUBLICATIONS IN CRITICALLY REVIEWED SCHOLARLY JOURNALS

EDITORSHIPS
Wayne Barrett, Associate Editor, Linear Algebra and its Applications.
Blake Peterson, Editorial Board, School, Science and Mathematics Education.
Charles Walter, Associate Editor, Journal of Mathematical Behavior.
Steve Williams, Editorial Board, Journal for Research in Mathematics Education (JRME)

RESEARCH AND CREATIVE ACTIVITIES FUNDING
James Cannon, NSF-DMS-9803868, $73,799.
Andrew Pollington, NSF, $60,000, 1997-1999.
Robert Speiser, Exxon Educational Foundation, $19,600, April1998- April1999.

GRADUATE STUDENT THeses AND DISSERTATIONS
APRIL 1998
M.A. (Thesis)
Timothy Dolbin, “Research influence in day-to-day teaching of one novice mathematics teacher” Steve Williams, advisor

M.A. (Non-Thesis)
Mary Dunn, “A discussion about two famous impossibilities related to compass and straightedge construction” Rod Forcade, advisor

M.S. (Non-Thesis)
Colin Brinkerhoff, “More characterizations of M-trees” Wayne Barrett, advisor
Vicki Herbst Kim, “An application of implicit differentiation and differential geometry to a milling tool machining algorithm” Gary Lawlor, advisor
David Russell, “The Black-Scholes options pricing formula” Chris Grant, advisor
Kristin Taylor, “A non-continuous homomorphism of the Hawaiian earring group” Greg Conner, advisor
Bryan Wise, “Gauge theory defined in terms of principal bundles” Tyler Jarvis, advisor

AUGUST 1998
M.A. (Thesis)
Rob Farnsworth, “How the graphing calculator affects the conceptual and procedural understanding of the derivative and the integral” Steve Williams, advisor
Carole Sullivan, “Making sense of counting combinations” Bob Speiser, advisor

M.A. (Non-Thesis)
Aminda Gonzales, “A project about pi” David Wright, advisor

M.S. (Thesis)
H. Tracy Hall, “Bounded ratios of principal minors of positive definite matrices” Wayne Barrett, advisor

M.S. (Non-Thesis)
KaraLynne Cook,” A general framework in discrete population models” Chris Grant, advisor

PhD
Dmitri Kuksov, “Cogrowth of Groups” Steve Humphries, advisor
Junping Shi, “Topics in nonlinear elliptic equations: (1) Bifurcation theory of nonlinear elliptic equations, (2) Spike layer solutions of Cahn-Hilliard equations” Peter Bates, advisor

DECEMBER 1998
M.S. (Non-Thesis)
Jason Haroldsen, “The adjoint mapping of a canonical form” Donald Robinson, advisor

PhD
Andreas Weingartner, “Integers free of prime divisors from an interval” David Clark, advisor

From the Annual Report of 1999–2000

CHAPTERS IN BOOKS AND REVIEWS


PUBLICATIONS IN CRITICALLY REVIEWED SCHOLARLY JOURNALS


EDITORSHIPS
Wayne Barrett, Associate Editor, Linear Algebra and its Applications.
Blake Peterson, Associate Editor, School, Science and Mathematics Education.
Charles Walter, Associate Editor, Journal of Mathematical Behavior.
Steve Williams, Editorial Board, Journal for Research in Mathematics Education (JRME)

OTHER EVIDENCE OF SCHOLARLY ACCOMPLISHMENT AND RECOGNITION
Jim Cannon, Governor, Intermountain Section, MAA.
Blake Peterson, Utah Council of Teachers of Mathematics Board.

GRADUATE STUDENT THESES AND DISSERTATIONS
APRIL 1999
M.S. (Thesis)
Greg Perkins, “Genus change in an inseparable field extension and dualizing sheaves” Bill Lang, Advisor

M.S. (Non-Thesis)
Lorraine Hellewell, “A comparison between two integrals” Gerald Armstrong, Advisor

AUGUST 1999
M.A. (Non-Thesis)
Kirsten Gilson, “Using continued fractions to break the RSA cryptosystem” Rod Forcade, Advisor
Lars Nordfelt, “Reform mathematics curricula for pre-algebra” Blake Peterson, Advisor

M.S. (Thesis)
Earl Cahill, “Computer implementation and experimentation of the quadratic sieve” Rod Forcade, Advisor
Todd Fisher, “Qualitative behavior for a non-linear convection-diffusion equation with conservation” Chris Grant, Advisor
M.S. (Non-Thesis)
Sarah Brown, “The Mullins-Sekerka flow in three-dimensional space” Peter Bates, Advisor
Thomas Milligan, “Upper bounds on the spectral radius of graphs” Wayne Barrett, Advisor
Denise Raynes, “A basic introduction to quantum computing” Greg Conner, Advisor

PhD
Fengxin Chen, “On the nonlocal phase field models” Peter Bates, Advisor
Junping Wang, “Bifurcation from simple eigenvalues of some elliptic equations and topics in nonlocal phase field systems” Peter Bates, Advisor

DECEMBER 1999
M.S. (Thesis)
Jane Loftus, “Random walks on Cayley graphs of dihedral groups” Lynn Garner, Advisor
Emma Turner, “Some properties of the big fundamental group” Greg Conner, Advisor


NEW AND VISITING FACULTY/LEAVES
Part-Time: Larry Kimball, Vladimir Solovjov, David Tovey, Beth Verbanatz, Kerry Wyckoff
Tenure-Track: Michael Dorff
Math Lab Administrator: Kristin Taylor
Retirements: Don Snow 1 July 2000

SCHOLARLY WRITING

EDITORSHIPS
Roger Baker, I have retired as Editorial Advisor to London Mathematical Society journals, but was involved in winding up existing submissions throughout 2000.
Wayne Barrett, Associate Editor, Linear Algebra and its Applications.
Peter Bates, Editor, Transactions of the American Mathematical Society.
Peter Bates, Editor, Memoirs of the American Mathematical Society.
Peter Bates, Editor, Electronic Journal of Differential Equations.

SUMMER 2000 UNDERGRADUATE RESEARCH FELLOWSHIPS
David Cardon with student Pace Nielsen for “Operators producing entire functions with zeros on a line.”
David Clark with student Paul Jenkins on “Number Theory & Physics.”
Rod Forcade with student Simon Hill on “Untouchable Numbers.”
Scott Glasgow with student Patricio Eduardo Alvarez on “Transition to Lasing Statistics.”
Don Snow with student Steven Butler.
Jasbir Chahal with student Marianne Finkenhagen on “History of Ancient Greek Problems.”

FALL 2000 UNDERGRADUATE RESEARCH FELLOWSHIPS
Stephen Humphries with student Sara Smoot on “Markov’s Equation.”
Stephen Humphries with student Kevin Bylund on “Representations of B3.”
David Cardon with student Pace Nielsen on “Convolution operators and zeros of entire function.”
Dale Peterson with student Benjamin Webb on “Eigenvalues of line graphs.”
Scott Glasgow with student Patricio Alvarez on “VCSEL simulation.”
Rod Forcade with student Andrew Witt on “Four-dimensional Tilings.”
David Clark: Directed Honors Thesis of Paul Jenkins on “Largest Prime Divisor of an Odd Perfect Number is Greater than 10^7. (Has been submitted for publication.)”
GRADUATE STUDENT THESES AND DISSERTATIONS

APRIL 2000

M.S. (Thesis)
- Danial Howard, “A study of the Method of Incremental Unknowns” Steven McKay, Advisor
- Jeremy Magland, “Counting in Groups” Stephen Humphries, Advisor

M.S. (Non-Thesis)
- Hugh Brown, “Permutation Polynomials over Finite Fields” Jasbir Chahal, Advisor
- Gina Thompson, “Generating codes using the doubling map” Peter Bates, Advisor

M.A. (Thesis)
- Jennifer Stanley, “Introduction to Variables: Student Responses after One Year of Pre-Algebra” Steven Williams, Advisor

M.A. (Non-Thesis)
- Anne Crosland, “Equivalent Definitions of Conic Sections” David Wright, Advisor
- Jana Rigby, “Sixth Grade Student Number and Operating Sense on Multiplication Problems” Blake Peterson, Advisor
- Cynthia Ruchti, “A Closer Look at the Completeness Property” David Wright, Advisor

AUGUST 2000

M.S. (Thesis)
- Jonathan Bodrero, “An analysis of dilemmas and discourse encountered while teaching mathematics to preservice elementary teachers” Blake Peterson, Advisor

M.S. (Non-Thesis)
- Jessie Bunting, “Computing the Inhomogeneous Binary Minimum using Continued Fractions” David Clark, Advisor
- Spencer Hall, “Floquet’s Theorem Applied to a Photonic Bandgap Materials Model” Steven McKay, Advisor
- Brian Liechty, “An Analysis of the Heath, Jarrow, Morton Interest Rate Model with Applications” David Clark, Advisor

PhD
- Kathryn Andrist, “A three-manifold with non-trivial fundamental group which does not admit non-trivial group actions” Peter Bates, Advisor

DECEMBER 2000

M.S. (Non-Thesis)
- Michael Higley, “Technical Analysis in the Foreign Exchange Market” David Clark, Advisor

From the Annual Report of 2001–2002

Scholarly Productivity
Instructional Textbooks
KUTTLER, K. L., Basic Analysis, Rinton Press.

Chapters in Books

Articles in Books
Mathematics Major Information

<table>
<thead>
<tr>
<th>Undergraduate Majors</th>
<th>Winter</th>
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Graduate Degrees

APRIL 2001

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<tbody>
<tr>
<td>Shane Tang</td>
<td>An analysis of research on [14]</td>
<td>Barstow Community College, CA</td>
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DECEMBER 2001

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<tr>
<td>Andrea Perrine</td>
<td>Calcium Waves in Xenopus Laevis Oocytes</td>
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Undergraduate Research Fellowships

Winter 2001

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<th>Research Project</th>
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<tr>
<td>David Cardon</td>
<td>Pace Nielsen</td>
<td>Convolution operators and zeros of entire function</td>
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<td>Rod Forcade</td>
<td>Andrew Witt</td>
<td>Four-dimensional Tilings</td>
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<tr>
<td>Dallon</td>
<td>Foster</td>
<td>Spiral waves in the Fitzhugh Nagumo</td>
</tr>
<tr>
<td>Stephen Humphries</td>
<td>Sara Smoot</td>
<td>Markov’s Equation</td>
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<td>The Generalized Markoff Tree</td>
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Spring/Summer 2001

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<td>Camille Jones</td>
<td>Minimal surfaces</td>
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<td>Tyler Jarvis</td>
<td>Jeremy R. Ricks</td>
<td>Rational points on elliptic surfaces in positive characteristic</td>
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Fall 2011

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<tr>
<td>Conner/Grant</td>
<td>Jacob Durrant</td>
<td>Ranking algorithms</td>
</tr>
<tr>
<td>Michael Dorff</td>
<td>Keith Penrod</td>
<td>Surface area as d(Vol)</td>
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<tr>
<td>Scott Glasgow/Gro Hovhannisyan</td>
<td>Curtis Broadbent</td>
<td>Susceptibility as energy</td>
</tr>
<tr>
<td>Melissa Clayton</td>
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<td>Susceptibility as energy</td>
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Science Day

The annual Science Day was held on 13 October 2001. Several faculty presented talks.
Lynn Garner: “A Budget of Paradoxes”
Rodney Forcade: “Algorithms for fun and profit”
Denise Halverson: “Soap Bubble Mathematics” Presented at the UCTM (Utah Council of Teachers of Mathematics) Conference held on the same day.
Michael Dorff: “Games that Reinforce Math Concepts”
David Wright: “Exponents and Large Sums From the Children’s Storybook: The Rajah’s Rice”

Scholarly Activity

Chapters in Books

Mathematics Major Information

<table>
<thead>
<tr>
<th>Undergraduate Majors</th>
<th>Winter</th>
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<th>Fall</th>
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<tbody>
<tr>
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<td>MS</td>
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Graduate Degrees

APRIL 2002

<table>
<thead>
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<th>M.S.</th>
<th>Thesis Title</th>
<th>After graduation</th>
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<tbody>
<tr>
<td>Ruoya Liu</td>
<td>Numerical Simulation of Oil Reservoir</td>
<td>MS in Statistics, BYU</td>
</tr>
<tr>
<td>Danae Romrell</td>
<td>Universal Monomial Representations</td>
<td>The Harker School, San Jose, CA</td>
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AUGUST 2002

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis Title</th>
<th>After graduation</th>
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<tbody>
<tr>
<td>Elizabeth Hutchings</td>
<td>A Mathematical Model of Collagen using Viscoelastic Elements</td>
<td>Teach Math at Peru High School, Peru, Indiana</td>
</tr>
<tr>
<td>Paul M. Jenkins</td>
<td>Isolated Inhomogeneous Minima of Binary Quadratic Forms</td>
<td>PhD, University of Wisconsin</td>
</tr>
<tr>
<td>Rachel Wood Jenkins</td>
<td>CAT(0) Rips Complexes</td>
<td>Went with husband to Wisconsin</td>
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<tr>
<td>Erin E. Summers</td>
<td>Proof that there is no surjective map from the Hawaiian earring group to the double Hawaiian earring group</td>
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<table>
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<th>PhD</th>
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<td>Nephi A. Noble</td>
<td>The expansion of graphs along integer eigenvalues</td>
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Undergraduate Research Mentorships

Winter 2002

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<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
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<tr>
<td>Wayne Barrett</td>
<td>Michael Barrus</td>
<td>Degree Sequences of Graphs</td>
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<tr>
<td>David Clark</td>
<td>Micah Allred</td>
<td>Option Pricing</td>
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<tr>
<td>Greg Conner</td>
<td>Joseph Durrant</td>
<td>Rankings</td>
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<tr>
<td>John Dallon</td>
<td>Casey Patrick Johnson</td>
<td>Cellular Automata</td>
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<tr>
<td>Scott Glasgow</td>
<td>Melissa Clayton</td>
<td>Energy in Dispersive Dieletrics</td>
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<tr>
<td>Scott Glasgow</td>
<td>Curtis Broadbent</td>
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Spring/Summer 2002

<table>
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<td>Vencil Skarda</td>
<td>Brian Hansen</td>
<td>Putnam Exam Preparation</td>
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<tr>
<td>Scott Glasgow</td>
<td>Curtis Broadbent</td>
<td>Energy Transfer in Dispersive Dielectrics</td>
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<tr>
<td>Wayne Barrett</td>
<td>Dena Plant</td>
<td>Matrix Positivity Classes</td>
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Fall 2002

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<tr>
<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
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<tbody>
<tr>
<td>John Dallon</td>
<td>Casey Johnson</td>
<td>Cellular automata and spiral waves</td>
</tr>
<tr>
<td>Michael Dorff</td>
<td>Robert Bradshaw</td>
<td>Geometric analysis and minimal surface theory</td>
</tr>
<tr>
<td>Scott Glasgow</td>
<td>Curtis Broadbent</td>
<td>Dielectrics, reversibility and information transport</td>
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<tr>
<td>Denise Halverson</td>
<td>Lauritz Petersen</td>
<td>Characterizing planar sets with nice complements</td>
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<td>Stephen Humphries</td>
<td>John Stovall</td>
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<td>Tyler Jarvis</td>
<td>Nathan Manwaring</td>
<td>Elliptic surfaces in characteristic $p$</td>
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<td>William Smith</td>
<td>Emily Ann Gubler</td>
<td>Dispersion and grouping of living organisms.</td>
</tr>
<tr>
<td>Vianey Villamizar</td>
<td>John Robinson</td>
<td>Wave propagation</td>
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In addition, the following has been awarded a partial mentorship as described:

<table>
<thead>
<tr>
<th>Faculty Member</th>
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<th>Topic</th>
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<tr>
<td>Darrin Doud</td>
<td>Brian Hansen</td>
<td>$700</td>
<td>Putnam Exam</td>
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</table>

Graduate Student Awards

Our department, along with the Department of Mathematics Education, held the 6th Annual Pi-Mile Fun Run on April 18th, which was a big success. Many undergraduate majors, graduate students, faculty and staff joined in a fun run/walk, followed by a barbecue and games. Awards were also presented for the spring research conference winners, graduate teaching performance, graduate service and outstanding major.

Graduate Student Teaching Awards: Elizabeth Hutchings
Graduate Service Awards: Jason Grout, Rachel Jenkins, Danae Romrell

Undergraduate Student Awards

Orson Pratt Prize: This year the recipient was Melissa Clayton.
Other honorees included Randall Lewis as outstanding Junior major.

Trjitzinsky Scholarship: Julie Brinton, a first-year graduate student in the Department of Mathematics at Brigham Young University, has been awarded the prestigious Waldemar J. Trjitzinsky Scholarship by the American Mathematical Society. Julie received the $4,000 scholarship at the beginning of Fall Semester and a formal presentation was made October 14, 2002, by the Department of Mathematics on behalf of the AMS. Faculty members with Julie are Rod Forcade, Lynn Garner, and Tyler Jarvis. The AMS selects a few universities in the United States each year and invites their departments of Mathematics to nominate a student to receive this scholarship. Julie’s outstanding performance as an undergraduate earned her the nomination and the scholarship.

Science Day

The annual Science Day was held on 12 October 2002. Several faculty presented talks.
Spring Research Conference

The 16th Annual Spring Research Conference, sponsored by Brigham Young University’s College of Physical and Mathematical Sciences, was held on 16 March 2002. We had 19 students participate. David Wright was the organizer from our department, and Andrew Pollington coordinated the conference this year.

State Math Contest

This was the third and final year that BYU hosted the Utah State Math Contest. In 2000 William Smith coordinated the contest and for the last two years the coordinator has been John Dallon. The contest involves students from all of the junior high and high schools in the state and involves approximately 3,000 students each year. The contest will move to Weber State University for the next 3 years.

2002 Mathematics Institute

Mathematics Institute Participants: Sabrina Balch, Athens State Univ. (Alabama); Elizabeth Bouzarth, Dickinson College (Pennsylvania); David Bradshaw, BYU; Julie Brinton, BYU; David Chen, BYU Hawaii; Nancy Erickson, Rutgers University (New Jersey); Sorelle; Friedler, Swarthmore College (Pennsylvania); Sky Hackett, University of Colorado, Boulder; Amber Hackstadt, Southeast Missouri State University; Lindsay Hilbert, Franklin & Marshall College (PA); Tyler Hooker, Judson College (Illinois); Lauritz Petersen, BYU; Amy Poston, College of Wooster (Ohio); Deborah Slater, Muhlenberg College (Pennsylvania); Shannon Smith, College of Mt. St. Joseph (Ohio); Mary Touchet, BYU.

Speakers

James Cannon, BYU; John Dallon, BYU; Michael Dorff, BYU; Darrin Doud, BYU; Denise Halverson, BYU; Xian-Jin Li, BYU; Helen Moore, Stanford University; Beth Schaubroeck, US Air Force Academy; Donald Snow, BYU; Gina Thompson, L-3 Communications; David Wright, BYU.

Dr. Wayne W. Barrett was awarded the Karl G. Maeser Excellence in Teaching Award.

Professor John Dallon envisions a world with no scars. Burns, scrapes, gashes, and slices would heal without mark or lasting tissue damage. Blemishes would be prevented with the rub of an ointment.

Lisa Ann Jackson wrote an article on John Dallon in the Spring Issue of BYU MAGAZINE, 2002.

From the Annual Report of 2003–2004

Scholarly Productivity

References and Creative Books
GLASGOW, SCOTT; Ware, Michael; Peatross, Justin, Monograph in preparation: Energy Accounting in Linear Dielectrics, Nova Science Publishers
JARVIS, TYLER; (edited by W. Pack), Gambling, an annotated bibliography, self-published.

Instructional Textbooks
Chahal, Jasbir, revised some material on his History of Mathematics text.

Chapters in Books
Glasgow, Scott, Dynamical free energy and loss in dispersive/dissipative dielectrics, Advances in Laser and Optical Science
Editorships
BARRETT, WAYNE, Associate Editor for *Linear Algebra and Its Applications*.
JARVIS, TYLER, Editor, Proceedings of the Conference on Gromov-Witten Theory of Spin Curves and Orbifolds

Research Funding:
CANNON, J. W.: NSF $105,036, Grant #DMS-0104030, three year: 7-01-01 til 6-30-04.
CHOW, SUM about $3000, Univ. of Texas-Austin Inst. For Computational Engineering and Sciences Fellowship, two weeks in March 2003.
CHOW, SUM: SIAM/NSF, $1,500 Travel grant for ICIAM 2003, Sydney, Australia
CONNER, GREG: NSF still funding the Wasatch Topology Conference
DORFF, MICHAEL: NSF $8,400, PI, an external grant to the National Research Council, COBASE (Collaboration in Basic Science and Engineering) Program
JARVIS, TYLER: NSF $70,890.
LI, XIANJIN: National Security Agency, Spectral theory of automorphic forms and Beurling-Selberg extremal functions
LU, KENING: NSF $168,001, Theory and Applications for Infinite Dimensional Dynamical Systems.
LU, KENING: $12,000 U.S.-Asian Workshop on Nonlinear Dynamics and Stochastic Partial Differential Equations, Institute for Research and Development
SMITH, WILLIAM: $4,000 to provide travel for meetings
WRIGHT, DAVID: NSF $12,000, Geometric Topology Workshop.

Personnel
*Winter 2003*
Adjunct Faculty: Younsun Choi
Evening Faculty: Jill Brimhall, Owen Denison, Reinhard Franz, Jane Loftus, Keith Olson, Royce Shelley, Vladimir Solovjov
Math Lab Administrator: Jackie Robertson
Faculty On Leave: Peter Bates, Michael Dorff, Kening Lu, Andrew Pollington
Part-Time Faculty: Hal Moore

*Fall 2003*
Evening Faculty: Jill Brimhall, Ivan Clarke, Owen Denison, Reinhard Franz, Jane Loftus, Royce Shelley, Vladimir Solovjov
Math Lab Administrator: Jackie Robertson
Faculty On Leave: Peter Bates, Kening Lu, Andrew Pollington
Part-Time Faculty: Hal Moore

Mathematics Major Information

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<tr>
<th>Undergraduate Majors</th>
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Graduate Degrees
*APRIL 2003 GRADUATES*

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<tbody>
<tr>
<td>Steven Butler</td>
<td>Bounding the number of graphs containing very long induced paths</td>
<td>PhD at the University of California San Diego</td>
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<tr>
<td>Marcia Riddle</td>
<td>Sandwich theorem and theta Function</td>
<td>Teacher at Wasatch Academy</td>
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### AUGUST 2003 GRADUATES

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<td>Exterior blocks and reflexive noncrossing partitions</td>
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### DECEMBER 2003 GRADUATES

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<tbody>
<tr>
<td>Jason Grout</td>
<td>UltracConnected and critical graphs</td>
<td>PhD BYU</td>
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<tr>
<td>Leslie Pack</td>
<td>Exploration of travelling wave solutions in a model for chronic wound healing</td>
<td>Full-time Mother</td>
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<tr>
<td>Gretchen Rimmasch</td>
<td>Lattices and their application to rational elliptic surfaces</td>
<td>PhD BYU</td>
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<tr>
<td>Julie Brinton Rogers</td>
<td>Configurations of singular Fibres of rational elliptic surfaces over a field of characteristic three</td>
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### Undergraduate Research Mentorships

#### Winter 2003

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
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<tbody>
<tr>
<td>Wayne Barrett</td>
<td>Dena Plant</td>
<td>Sharp Bounds for Ratios of Principal Minors of Positive Definite Matrices</td>
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<tr>
<td>Sum Chow</td>
<td>Ryan Funk</td>
<td>Numerical Solutions of Nonlinear Seepage Flows</td>
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<td>John Dallon</td>
<td>Robert Turner</td>
<td>Modeling Fibrous Structures with Viscoelastic Elements</td>
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<tr>
<td>Denise Halverson</td>
<td>Joshua Hunter</td>
<td>The Network Problem on Closed 2-Manifolds with Constant Gaussian Curvature</td>
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<td>Stephen Humphries</td>
<td>Allen Dickson</td>
<td>Automatic Groups</td>
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<tr>
<td>Tyler Jarvis</td>
<td>Nathan Manwaring</td>
<td>Combinatorics of Inequality Sequences</td>
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<tr>
<td>Tyler Jarvis</td>
<td>Sean Tibbitts</td>
<td>Survivor Sequences</td>
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<td>John Robinson</td>
<td>Wave Propagation</td>
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#### Spring/Summer 2003

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<td>James Cannon</td>
<td>Sharleen De Gaston, John Bankhead</td>
<td>Thompson’s Group</td>
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<tr>
<td>David Cardon</td>
<td>Sharleen De Gaston, John Bankhead</td>
<td>Orthogonal Polynomials</td>
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<td>Sum Chow</td>
<td>Ryan Funk</td>
<td>Porous Medium Flows</td>
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<td>Christopher Cornwell</td>
<td>Braid Groups</td>
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<td>Sean Tibbitts</td>
<td>Colored Permutations</td>
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<tr>
<td>Eric Swenson</td>
<td>Brent Gorbett</td>
<td>Peano Continua</td>
</tr>
<tr>
<td>Vianey Villamizar</td>
<td>John Robinson</td>
<td>Wave Propagation</td>
</tr>
</tbody>
</table>

#### Fall 2003

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Glasgow</td>
<td>Sara Smoot, Brigham Frandsen, Josh Hunter, Kurt Christen</td>
<td>Energy in Dielectrics</td>
</tr>
<tr>
<td>Stephen Humphries</td>
<td>Robert Bradshaw</td>
<td>Combinatorics of Braid Groups</td>
</tr>
<tr>
<td>Stephen Humphries</td>
<td>Chris Cornwell</td>
<td>Braid Groups</td>
</tr>
</tbody>
</table>

293
**Darrin Doud** has been awarded a partial mentorship for Putnam Exam for the following students: Robert Anderson, Jonathan Blackhurst, Edward Cannon, Jon Fredrickson, Aaron Hill, McKay Salisbury, and John Sinkovic.

**From the Annual Report of 2004–2005**

**Personnel**

**Winter 2004**

**Regular Faculty:** Baker, Roger; Bakker, Lennard; Barrett, Wayne; Cannon, James; Cardon, David; Chahal, Jasbir; Chow, Shue-Sum; Clark, David; Conner, Gregory; Dallon, John; Dorff, Michael; Doud, Darrin; Fearnley, Lawrence; Forcade, Rodney; Garner, Lynn; Chair; Glasgow, Scott; Grant, Christopher; Assoc. Chair; Halverson, Denise; Humphries, Stephen; Jarvis, Tyler; Kuttler, Kenneth; Lamoreaux, Jack; Lang, William; Li, Xian-Jin; McKay, Steven; Ouyang, Tiancheng; Skarda, R. Vencil; Smith, William; Swenson, Eric; Tolman, L. Kirk; Villamizar, Vianey; Wright, David

**Adjunct Faculty:** Moore, Hal; Wyckoff, S. Kerry

**Administrative/Staff:** Logan, James; Smith, Leri Dawn; Robertson, Jackie; Stoddard, Lonette

**Student Secretaries:** Thorley, Jennifer; Yorgason, Andrew; Yorgason, Michelle

**Evening School Instructors:** Brimhall, Jill; Denison, Owen; Franz, Reinhard; Loftus, Jane; Shelley, Royce; Turner, Emma

**Fall 2004**

**Faculty:** Baker, Roger; Bakker, Lennard; Barrett, Wayne; Cannon, James; Cardon, David; Chahal, Jasbir; Chow, Shue-Sum; Clark, David; Conner, Gregory; Dallon, John; Dorff, Michael; Doud, Darrin; Fearnley, Lawrence; Forcade, Rodney; Garner, Lynn; Chair; Glasgow, Scott; Grant, Christopher; Assoc. Chair; Halverson, Denise; Jarvis, Tyler; Kuttler, Kenneth; Lang, William; Li, Xian-Jin; Lu, Kening; McKay, Steven; Ouyang, Tiancheng; Pollington, Andrew; Skarda, R. Vencil; Swenson, Eric; Tolman, L. Kirk; Villamizar, Vianey; Wright, David

**Faculty On Leave:** Humphries, Stephen; Smith, William

**Adjunct Faculty:** Moore, Hal; Wyckoff, S. Kerry

**Administrative/Staff:** Logan, James; Smith, Leri Dawn; Robertson, Jackie; Stoddard, Lonette

**Student Secretaries:** Thorley, Jennifer; Yorgason, Michelle

**Evening School Instructors:** Clarke, Ivan; Franz, Reinhard; Loftus, Jane; Shelley, Royce; Solovjov, Vladimir

**From the Annual Report of 2005–2006**

**College Research Grants**

Roger Baker $800; Michael Dorff $2000; Andy Pollington $1000; Lennard Bakker $2900; Darrin Doud $3500; Eric Swenson $1400; David Cardon $2800; Denise Halverson $3700; Vianey Villamizar $3700; Jasbir Chahal $1000; Jeff Humpherys $2000; Sum Chow $2700; Tyler Jarvis $3000; Greg Conner $2300; Xian-Jin Li $2200; John Dallon $1900; Steven McKay $3600.

**Scholarly Productivity**

**Faculty Edited Scholarly Books**


**Chapters in Books and Reviews**

BAKER, ROGER: Schäffer’s Determinant Argument, Diophantine Problems, Birkhäuser; Vienna.

CANNON, JAMES: Weadly type preserving sequences and strong convergence, Geometria Dedicata, Editor Richard Evans, Zentralblatt.
CANNON, JAMES: The mapping class group of the twice punctured torus, J.R. Parker and C. Series, Zentralblatt.

Editorships
BARRETT, WAYNE Associate Editor for Linear Algebra and its Applications
LU, KENING Taiwanese Journal of Mathematics
WRIGHT, DAVID Editor of the Proceedings of the Twentieth Annual Workshop in Geometric Topology (2003)

Significant Intellectual Properties
GARNER, LYNN Calculus textbook Custom editions owned by BYU; National editions owned by LLC

Gifts Use for Research
NSF: CONNER, GREG : Wasatch Topology Conference
NSF: CONNER, GREG $1,350, Plenary lecturer at International Conference and Worships on Geometric Topology.
Fulbright Scholar Program (U.S. State Dept.): DORFF, MICHAEL, $25,000 Research Fulbright Scholar fro 5 month visit in fall 2005 to Poland.
NSA: DOUD, DARRIN, $11,215 NSA Young investigator grant.
NSF: WRIGHT, DAVID: Geometric Topology Workshop with C. Guilbault and F. Ancel (University of Wisconsin, Milwaukee), F. Tinsley (Colorado College), D. Garity (Oregon State), G. Venema (Calvin College), 2002-present.
NSF: CONNER, GREG Wasatch Topology Conference.

Mathematics Major Information

<table>
<thead>
<tr>
<th>Undergraduate Majors (BS)</th>
<th>Graduate Majors</th>
<th>MS</th>
<th>PhD</th>
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<tr>
<td>Winter 2005</td>
<td>158</td>
<td>21</td>
<td>13</td>
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<tr>
<td>Spring 2005</td>
<td>66</td>
<td>24</td>
<td>13</td>
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<td>Summer 2005</td>
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<td>24</td>
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<tr>
<td>Fall 2005</td>
<td>200</td>
<td>19</td>
<td>14</td>
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Graduate Degrees

AUGUST 2005 GRADUATES

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis/Project Title</th>
<th>After graduation</th>
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<tbody>
<tr>
<td>Andrus, Ivan</td>
<td>Matrix Representations of Automorphism Groups of Free Groups</td>
<td>Work for Omniture</td>
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<tr>
<td>Dickson, Allen</td>
<td>Maximal Surfaces in Complexes</td>
<td>PhD at the University of Utah</td>
</tr>
<tr>
<td>Name</td>
<td>Thesis Title</td>
<td>After graduation</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Grizzle, Linda</td>
<td>Three Pension Cost Methods under Varying Assumptions</td>
<td>Watson Wyatt Worldwide (actuary)</td>
</tr>
<tr>
<td>Hansen, Brian F.</td>
<td>Explicit Computations Supporting a Generalization of Serre’s Conjecture</td>
<td>PhD. at BYU</td>
</tr>
<tr>
<td>Johnson, Casey</td>
<td>A Mathematical Model of Adhesion Interactions between Living Cells</td>
<td>PhD at the University of Utah</td>
</tr>
<tr>
<td>Jones, Steven R.</td>
<td>Hopf Bifurcations and Horseshoes Especially Applied to the Brusselator</td>
<td>PhD in Math Ed. University of Maryland</td>
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<td>Meilstrup, Mark</td>
<td>Classifying Homotopy Types of One-Dimensional Peano Continua</td>
<td>PhD. at BYU</td>
</tr>
<tr>
<td>Petersen, W. Lauritz</td>
<td>The Lie Symmetries of a Few Classes of Harmonic Functions</td>
<td>PhD at the University of Utah</td>
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### PhD Dissertations and After Graduation

**DECEMBER 2005 GRADUATES**

<table>
<thead>
<tr>
<th>PhD</th>
<th>Dissertation Title</th>
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### M.S. Dissertations and After Graduation

**M.S.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Thesis Title</th>
<th>After graduation</th>
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<tbody>
<tr>
<td>Ellis, Amanda</td>
<td>Classification of Conics on the Tropical Projective Plane</td>
<td>PhD at the University of Utah</td>
</tr>
<tr>
<td>Melo, Heather</td>
<td>Totally Real Galois Representations in Characteristic 2 and Arithmetic Cohomology</td>
<td>Moved to Brazil with husband</td>
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### Undergraduate Research Mentorships

**Winter 2005**

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
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</thead>
<tbody>
<tr>
<td>Lennard Bakker</td>
<td>Jared Whitehead</td>
<td>Topological bifurcations</td>
</tr>
<tr>
<td>Wayne Barrett</td>
<td>Don March</td>
<td>Minimal ranks of graphs</td>
</tr>
<tr>
<td>Rod Forcade</td>
<td>Darryl Wade</td>
<td>Tilings</td>
</tr>
<tr>
<td>Scott Glasgow</td>
<td>Matt Robinson</td>
<td>Passive circuit model reduction</td>
</tr>
<tr>
<td>Tyler Jarvis</td>
<td>Diana Dimond and Darryl Wade</td>
<td>Tropical and phylogenetic algebraic geometry</td>
</tr>
<tr>
<td>Tiancheng Ouyang</td>
<td>Tim Ruggles</td>
<td>Classical and celestial mechanics</td>
</tr>
<tr>
<td>Vianey Villamizar</td>
<td>Joseph Mabey</td>
<td>Grid control applied to acoustical scattering</td>
</tr>
</tbody>
</table>

**Spring/Summer 2005**

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
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<tbody>
<tr>
<td>Darrin Doud</td>
<td>Meghan DeWitt</td>
<td>Certain Galois representations</td>
</tr>
<tr>
<td>Sum Chow</td>
<td>Mark Hendricks</td>
<td>Investigating numerical solutions of reaction-diffusion equations.</td>
</tr>
<tr>
<td>Denise Halverson</td>
<td>Greg Miller and Don March</td>
<td>Steiner problem on non-Euclidean surfaces</td>
</tr>
<tr>
<td>Jeff Humphreys</td>
<td>Keith Rudd</td>
<td>Finite difference and finite element methods for computing the Cauchy problem for traveling waves in evolutionary partial differential equations.</td>
</tr>
<tr>
<td>Tyler Jarvis</td>
<td>Aaron Hill</td>
<td>Tropical geometry</td>
</tr>
</tbody>
</table>

**Fall 2005**

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Student</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lennard Bakker</td>
<td>Jared Whitehead</td>
<td>Complex Dynamics</td>
</tr>
<tr>
<td>Darrin Doud</td>
<td>Meghan DeWitt</td>
<td>Icosahedral Galois representation</td>
</tr>
<tr>
<td>Denise Halverson</td>
<td>Greg Miller</td>
<td>Steiner Problems on Constant Curves</td>
</tr>
<tr>
<td>Tyler Jarvis</td>
<td>Diana Dimond</td>
<td>Expected Value of Lotteries</td>
</tr>
</tbody>
</table>
From the Annual Report of 2006–2007

In 2006, we began a serious effort to improve the quality of our undergraduate major programs and our undergraduate service courses. These programs and courses were already very good compared to other mathematics departments nationally, but we as a department are confident that we can make them still better. So we have begun working toward the long-term goal of making our undergraduate major programs and service courses the best in the nation.

Mentoring As part of our goal to improve our undergraduate programs, we have made undergraduate research mentoring a major point of emphasis in the department. Although mentoring is growing across BYU campus, it is highly unusual for mathematics departments. Part of the reason it is unusual is that it requires significant work to find mathematical problems that undergraduates can understand, let alone contribute to. One of our main accomplishments in the past few years has been learning to overcome this and other traditional obstacles to successful mentoring in mathematics.

We have had a substantial increase in the number of students participating in mentoring projects and a corresponding increase in the number of student publications and presentations.

The National Science Foundation granted us $1.3 million to fund the Center for Undergraduate Mentoring in Mathematics at BYU (CURM) in September 2006, making BYU the national center for undergraduate mentoring in mathematics.

IDeA labs (a joint venture between Mathematics and Computer Science) received a $700,000 CSUMS grant from the National Science Foundation to support undergraduate mentoring in mathematics, computer science, and statistics.

CURM The combination of a growing national interest in undergraduate mentoring coupled with the significant difficulties that mathematics faculty elsewhere continue to have with mentoring motivated us to think about how we could share our successes with other mathematics departments around the country. As part of that, several of our faculty (Michael Dorff, Denise Halverson, Jeff Humpherys, and Tyler Jarvis) proposed to the National Science Foundation the founding of the Center for Undergraduate Research in Mathematics (CURM) at BYU. The National Science Foundation awarded the proposal $1.3 million in September of 2006 to enable us to share our mentoring model and ideas with other universities and colleges.

Outside interest in CURM is very high, and we have had many people (65) apply to participate. Joseph Gallian, President of the Mathematical Association of America, said about the program, “I am confident [it]...will be a wonderful success in helping students prepare for graduate study and in helping faculty develop the skills needed to engage students in original research.” Faculty from outside of BYU will begin visiting CURM in Summer 2007, and they and their students will also participate in the annual CPMS Spring Research Conference.

Reviewers of the CURM proposal were very impressed with the quality of the BYU Mathematics Department’s programs and the mentoring we have done to date. They said, “BYU is a large university with a superb record of bringing young people into mathematics.” “The intellectual merit of the BYU Undergraduate Math Research Program is excellent.” “BYU has an excellent record of bringing women into the mathematical enterprise.” “BYU has an admirable track record with regard to undergraduate research. It has done a particularly notable job in recruiting and retaining women.” “The department [has an] excellent record of mentoring its undergraduates and producing students who go on to prestigious graduate programs.”

IDeA Labs CSUMS Grant Jeff Humpherys was PI on another grant from the National Science Foundation. The NSF awarded the grant $700,000 to support IDeA labs, a joint venture between Mathematics and Computer Science, to involve students in research in algorithmic decision processes. Statistics and Computer science faculty were co-PIs on the grant.

NSF Sponsored Research Experience For Undergraduates Also related to our efforts in mentoring is our NSF sponsored Research Experience for Undergraduates (REU). Each summer undergraduate students come from around the country to BYU for several weeks to participate in an intensive mathematics research experience. Our REU program has developed a national reputation, so that in 2006 we had 90 applicants from
around the country for only 9 places. For comparison, REU at a large university nearby only had 16 applicants. One sign that the 2006 REU was successful is that the number of applicants for the 2007 REU was higher (92) than the previous year, despite the fact that the application deadline was set much earlier than it was in 2006. We had applicants from 72 different institutions and 31 different states in 2007.

**Results of Mentoring and Teaching**

*Students Involved in Mentored Research* The number of students involved in mentored research increased substantially this year, from 15 in 2005 to 26 in 2006. We expect that number to continue to increase in the future. We have several faculty members doing one-on-one research with students, and several larger groups of student researchers, including the Tropical Geometry group, the Minimal Surfaces group, and the Information and Decision Algorithms group.

*Student Conference Presentations and Posters* The number of undergraduate students giving research talks at the regional conference of the Mathematical Association of America (MAA) also increased in 2006. The number of undergraduate students involved in research in the BYU Mathematics Department is very large compared to mathematics departments at other universities and colleges. One measure of that is the total number of student presentations by other schools at the MAA meeting. The 2006 meeting involved 70 college and university mathematics departments. From those 70 schools, only 28 students gave presentations, and 13 of those 28 student presentations were by BYU mathematics students. One additional piece of evidence for the quality of our mentored research is the fact that in January 2007, Julian Tay, a senior math major doing mentored research in our Tropical Geometry Research Group, was selected as a national winner of the Student Poster Session of the American Mathematical Society/ Mathematical Association of America Annual Joint National Meeting.

*Students Continuing on to Doctoral Programs* The American Mathematical Society has tracked every PhD awarded in mathematics in the past 10 years and what their undergraduate institution was. According to that report, BYU is ranked number 14 out of 841 US institutions for the total number of undergraduates who continue on to finish a doctorate in mathematics or statistics. We are ranked ahead of much larger institutions, like Ohio State and the University of Texas, and ahead of many well-known institutions with solid mathematics programs, like Stanford, Notre Dame, Rice, University of Wisconsin, Northwestern University, and Duke.

*Activities for Undergraduates* In 2006, as part of our increased emphasis on providing undergraduate students with an excellent education, we started a new Undergraduate Colloquium series, and we improved our support for the Putnam Exam.

**Undergraduate Colloquium** Traditionally, mathematics colloquia are essentially impossible for undergraduates and most graduate students to understand or appreciate. It requires significant skill and effort to explain a complicated mathematical idea on the cutting edge of research at a level that students or even faculty from a different subspecialty can fully appreciate. Nevertheless, we feel it is essential that students have the opportunity to learn about the latest developments in the field and to get a real sense of the opportunities and exciting aspects of mathematics. To address this, we started the Undergraduate Colloquium Series. Speakers are specially chosen to be both noted mathematicians (either in academics or in industry) and skilled in explaining mathematics at a level that non-mathematicians can understand. We further instruct speakers to present their talk at the level of an undergraduate. We try to have three of these nationally known speakers come each semester. In 2006, we had Frank Morgan of Williams College, Ram Murty of Queens University, and Michael Starbird of the University of Texas.

Students seem to like the talks and attendance is high (we often fill 1170 TMCB or 3714 HBLL, which both have a capacity of about 200). Because of their national reputation as speakers, and because our series has developed a reputation for being interesting and understandable, these speakers attract many people from other colleges and universities. Many students reported increased enthusiasm for learning mathematics after hearing these talks, and many faculty have expressed an interest in making their own teaching more dynamic.

Lonette Stoddard, our department secretary, reports observing the following transpire at the rear of the auditorium during Frank Morgan’s talk:

One student was standing in the back watching Dr. Morgan’s talk. Some friends of his walked by and asked, “What are you doing?” “Watching a math talk.”
“Math!? Why are you doing that? You aren’t a math major.”
“I know, but this is interesting!”

One of our goals for this colloquium is to help students see past their stereotypes about mathematics to understand that it is both important and interesting. Judging by this experience, and the attendance at the colloquia, and the other positive comments and feedback we are getting from students, we are succeeding.

**Advising Majors**

We noticed in Summer 2006 that most of our majors were not getting any formal advisement from faculty. A few self-confident students sought out faculty informally for advisement, but most majors were not meeting with faculty at all for advisement, and none were doing it in an organized fashion.

In Fall 2006, we began a formal system of tracking our majors and scheduling regular meetings for them with faculty advisors. Of the 201 listed majors in Fall 2006, at least 107 of them had a formal advisement meeting with a faculty member. We have since met with 33 more and are currently working on meeting with the rest.

**Scholarship**

**Productivity and other Indicators**

Scholarly productivity has steadily increased for the past several years, and has almost doubled since 2003. Faculty activity has also increased steadily from 0.59 to 0.70. Moreover, corresponding to the increase in productivity, the total number of pages published in peer-reviewed, scholarly journals has steadily increased from 291 in 2003 to 533 in 2006.

**External Funding**

External funding increased seven-fold in 2006, from $384,827 in 2003 to $2,739,610 in 2006. Much of this funding was granted to support undergraduate research mentoring and other educational projects, but several faculty also received new research grants in 2006, including Jeff Humpherys (NSF), Xian-Jin Li (NSA), and Tyler Jarvis (NSF). It is important to note that external funding is unusual in pure mathematics, as there is only one significant funding source in the field—the National Science Foundation (although the National Security Agency and some other funding sources do play a minor role). In the United States the great majority of research mathematicians working in pure mathematics are not funded—neither by the National Science Foundation, nor by any other external funding agency.

Although there do not appear to be any hard statistics available, one can estimate using related data. For example, most research-active mathematicians publish an average of about one paper per year, and in 2002 there were at least 8,698 papers or monographs published in the fields of algebra, number theory, and combinatorics. But only 86 grants in those areas were funded by the National Science Foundation that year. Thus, a rough estimate would be that about 1% of research-active mathematicians are funded by the National Science Foundation in any given year. It is, therefore, noteworthy that, in addition to our educational and mentoring grants, 10% of our faculty received new research grants this year and a total of 16% of our faculty have external funding for research.

It is also important to note that the standard-sized grant in mathematics is normally quite small compared to the experimental sciences. Mathematics research grants rarely fund post-docs, graduate students, or major equipment purchases. The main support goes to faculty salary and travel. Consequently, grants in mathematics are typically only about $15,000 to $30,000 per year. Most of our external funding is within or close to this range, although the funding for Kening Lu is much higher than that.

**Oversight of Continuing Education Courses**

In Spring 2006, we became aware that several mathematics courses being offered through Continuing Education were not comparable to the courses being offered on campus. The most significant of these was Math 110 (college algebra), which apparently was being abused by an outside firm, Easiest Math Ever, to get students mathematics credit at other colleges and universities without learning the material that we would normally expect them to learn in Math 110. Although we had no clear proof of cheating, there were many problems and concerns about the way the students were coached and their calculators programmed by the Easiest Math Ever employees. As we investigated the situation, we found other courses with our name on them, offered through Independent Study and the Salt Lake Center, which were also easy targets for cheating or which were otherwise not up to the standards of our on-campus courses.

**Independent Study**

To address the problem with the Independent Study courses, we worked with Independent Study and CID to move control of these courses to the Mathematics department and away from individual faculty and independent contractors. Each of the two most problematic Independent Study courses—Math 110
and Math 119—is now under the supervision of the same faculty coordinator that supervises the on-campus version of that course. We are working with Independent Study to give all their mathematics courses the same careful oversight. Independent Study has been cooperative as we have made these changes. Also important to us is the fact that the faculty members who supervise these Independent Study courses now do it as part of their regular faculty load, with compensation for their work being paid to the department rather than to the faculty member. That removes a major potential conflict of interest that instructors of the Independent Study courses previously faced when teaching Independent Study courses—the temptation to lower standards in the Independent Study courses to attract more students.

Salt Lake Center We have also been working with the Salt Lake Center to improve the quality of the instructors and instruction in their courses. The staff and administrators at the Salt Lake Center have been cooperative and helpful as we have coordinated common syllabi and exams and taken other steps to improve the quality of the Salt Lake Center offerings.

### Majors and Graduates

#### Mathematics Major Enrollments

<table>
<thead>
<tr>
<th>Semester/Term</th>
<th>Undergraduate</th>
<th>Graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter 2006</td>
<td>186</td>
<td>25</td>
<td>211</td>
</tr>
<tr>
<td>Spring 2006</td>
<td>60</td>
<td>12</td>
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<tr>
<td>Summer 2006</td>
<td>48</td>
<td>14</td>
<td>62</td>
</tr>
<tr>
<td>Fall 2006</td>
<td>203</td>
<td>25</td>
<td>228</td>
</tr>
<tr>
<td><strong>Total 2006</strong></td>
<td><strong>497</strong></td>
<td><strong>76</strong></td>
<td><strong>573</strong></td>
</tr>
</tbody>
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#### August 2006 Graduates

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis/Project Title</th>
<th>After graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belt, Dustin</td>
<td>Topics on the Spectral Theory of Automorphic Forms</td>
<td>PhD at Purdue University</td>
</tr>
<tr>
<td>Blackhurst, Jonathan</td>
<td>Proven Cases of a Generalization of Serre’s Conjecture</td>
<td>PhD BYU</td>
</tr>
<tr>
<td>Cornwell, Christopher</td>
<td>On the Combinatorics of Certain Garside Semigroups</td>
<td>PhD Michigan State Univ.</td>
</tr>
<tr>
<td>Housley, Matthew</td>
<td>Conjugacy Classes of the Piecewise Group</td>
<td>PhD at University of Utah</td>
</tr>
<tr>
<td>Roberts, Sharleen</td>
<td>Knots Not for Naught</td>
<td>Actuary Standard Insurance</td>
</tr>
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#### PhD Graduates

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<tr>
<th>M.S.</th>
<th>Dissertation Title</th>
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<tbody>
<tr>
<td>Xie, Zhifu</td>
<td>On the $N$-body Problem</td>
<td>Post-doc College of William and Mary</td>
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#### December 2006 Graduates

<table>
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<tr>
<th>M.S.</th>
<th>Thesis Title</th>
<th>After graduation</th>
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<tbody>
<tr>
<td>Eliason, Eric</td>
<td>No project was required due to private circumstances</td>
<td></td>
</tr>
<tr>
<td>Sinkovic, John</td>
<td>Proven Cases of a Generalization of Serre’s Conjecture</td>
<td>PhD at Technische Universiteit Eindhoven</td>
</tr>
</tbody>
</table>

### Instructional Textbooks

Chahal, Jasbir S: A Brief Introduction to Algebraic Number Theory, Kendrick Press 2006

### Chapters in Books


Conference Proceedings


External Grants

Dorff, Michael John, National Science Foundation, $158,166.00, Brigham Young University Undergraduate Research Experiences in Mathematics.

Dorff, Michael John, National Science Foundation $1,262,854.00, Brigham Young University, Mentoring Through Critical Transitions: EMSW21-MCTP.

Dorff, Michael John, U.S. Fulbright $22,000.00, Research Scholar Award, Agency supporting a 5 month visit to conduct research and give research lectures at Katolicki Uniwersytet Lubelski and Maria Curie-Sklodowska Univ. (UMCS) in Poland.

Dorff, Michael John, Utah State Office of Education, $513,000.00, Improving Elementary Math Instruction for All: A BYU-Public School Partnership Program.

Doud, Darrin M, National Security Agency $11,215.00, Reducible Galois representations and arithmetic cohomology.

Halverson, Denise M (Jeffrey Humphreys, Tyler Jarvis), National Science Foundation $1,284,208.00, EMSW21-MCTP: Center for Mentoring Undergraduate Research in Mathematics.

Halverson, Denise M (Michael Dorff, Gary Lawlor, Scott Glasgow), National Science Foundation, $159,000.00, REU Site: Brigham Young Young Undergraduate Research Experiences in Mathematics.

Humpherys, Jeffrey C, National Science Foundation $152,206.00, Stability of Traveling Waves.

Humpherys, Jeffrey C (Michael Dorff, Denise Halverson, Tyler Jarvis), National Science Foundation, $1,269,972.00, Center for Mentoring Undergraduate Research in Mathematics.

Humpherys, Jeffrey C (Sean Warnick, William Christiansen, Shane Reese, Dennis Tolley), National Science Foundation $704,848.00, Information and Decision Algorithm Laboratories (IDeA Labs)

Jarvis, Tyler J, National Science Foundation $91,204.00, Stringy invariants, orbicurves, and topological field theory.

Jarvis, Tyler J (Michael Dorff, Denise Halverson, Jeffrey Humpherys), National Science Foundation $1,262,854.00, Center for Mentoring Undergraduate Research in Mathematics.

Li, Xian-Jin Li, Xian-Jin, National Security Agency $15,498.00 NSA Grant.

Lu, Kening, National Science Foundation $168,000.00, Theory and Applications for Infinite Dimensional Dynamical Systems.

Lu, Kening, National Science Foundation $270,000.00, Topics in Finite and Infinite Dimensional Random Dynamical Systems.
Wright, David Grant (C. Guilbault and F. Ancel (University of Wisconsin, Milwaukee), F. Tinsley (Colorado College), D. Garity (Oregon State), G. Venema (Calvin College)), National Science Foundation $13,500.00 Geometric Topology Workshop

**Personnel**

**Faculty Positions** We have 35 permanent FTEs. Of these, 32 were occupied by permanent-track faculty at the beginning of 2006, two were occupied by two-year visitors (Tom Kent and Tom Milligan), and one was occupied by a short-term visitor (Ken Johnson). We lost one permanent faculty member, Andrew Pollington, who left BYU to work elsewhere, and we hired three new faculty members in 2006: Pace Nielsen, Paul Jenkins, and Todd Fisher. Pace Nielsen finished his PhD at Berkeley in 2006 and will take a post-doctoral position at the University of Iowa before coming to BYU. Paul Jenkins finished his PhD at Wisconsin in 2006 and will first take a postdoctoral position at UCLA before coming to BYU. Both Pace Nielsen and Paul Jenkins will join our department as assistant professors in Fall 2008 or Fall 2009, depending on how their post-doctoral appointments go. Todd Fisher will join the department in June 2007. In Fall 2006, we had Maria Nowak, from Marie-Curie University in Poland, as a one-semester visitor to work with Michael Dorff on a joint research project.

**Rank and Status** We had one faculty member, Tyler Jarvis, promoted to the rank of professor in April 2006. In Fall 2006 four faculty members—Darrin Doud, Denise Halverson, Scott Glasgow, and Vianey Villamizar—began their final review, and one—Greg Conner—applied for promotion to the rank of professor. These are all still in process, and we expect to hear the results very soon.

**Leaves** Xian-Jin Li, John Dallon, Wayne Barrett, and Eric Swenson took leaves in Fall 2006.

**From the Annual Report of 2007–2008**

**CURM** After receiving a $1.3 million grant from the National Science Foundation in Fall 2006, we established the Center for Undergraduate Research in Mathematics (CURM) with Michael Dorff as the national director. Being awarded this grant to establish the first national center at BYU is a great honor to the university and recognizes the success that both BYU and the BYU Department of Mathematics have had in mentoring undergraduates in research. The objectives of CURM are to promote undergraduate research in mathematics throughout the United States by: (1) training professors as mentors for undergraduate research projects; (2) providing funds to professors to establish undergraduate student research groups at their own institution during the academic year; (3) advising professors on how to organize and continue to operate undergraduate research groups at their own institutions; and (4) preparing undergraduate students to succeed in graduate studies in mathematics. More information is available at the CURM website [http://curm.byu.edu/](http://curm.byu.edu/).

To accomplish these objectives, CURM provides about 15 mini-grants a year, ranging from $12,000-$20,000, to mathematics professors who apply for and are accepted into the program. These mini-grants consist of financial and organizational support for these professors’ undergraduate research groups. Specifically, the grant provides $5,000 for the professor to reduce his/her teaching assignment, a $3,000 stipend for each undergraduate student, and some funds for supplies. In March 2007, we received applications from 70 professors from 66 different universities/colleges to work with 226 undergraduates. We awarded mini-grants to 15 professors (9 female, 6 male; 3 from underrepresented groups) to work with 45 undergraduates (27 female, 18 male; 14 from underrepresented groups).

The research groups funded by CURM start their research during the beginning of the fall semester with the students committing 10 hours/week to the research project for two semesters. Typically, the entire group (2-4 undergraduates and 1 professor) meets at least two hours a week and the students meet and work together at least three hours a week. The rest of the time each individual student works on his/her research problem.

We are beginning to see some of the success of this program, even though it is still in its first year. For example, Kathryn Leonard, a CURM professor at Cal State Channel Islands (CSUCI) in Southern California, wrote the following: “After learning of my CURM group, the Dean of Faculty at CSUCI introduced a pilot undergraduate research program where faculty in any discipline may apply to receive teaching credit for offering a course where students work on research projects. In other words, institutionalization of undergraduate research at my university has been sparked by the buzz about my CURM experience.”
**IDeA Labs CSUMS Grant** In 2007, the NSF-funded IDeA Labs Mentoring Program commenced by recruiting and funding its first undergraduate cohort of 9 mathematics and statistics undergraduates. This yearlong program centers on research in dynamical systems and control applied to problems in numerous interdisciplinary fields such as math finance, operations research, biology, and the policy sciences. This program is directed by Jeffrey Humpherys (mathematics) and Sean Warnick (computer science) and is designed to introduce students to interdisciplinary research in the mathematical sciences, particularly in areas that require integrated strengths in applied mathematics and scientific computation. This program is funded by the NSF through 2010.

**NSF Sponsored Research Experience for Undergraduates** Also related to our efforts in mentoring is our NSF sponsored Research Experience for Undergraduates (REU) in Mathematics directed by Michael Dorff. The BYU Summer Mathematics REU is an exciting eight-week program: (1) to provide undergraduate students with the opportunity to experience doing mathematical research; (2) to encourage undergraduate students, especially female students and students from institutions with limited research opportunities, to attend graduate school in mathematics; and (3) to prepare participants to be successful in graduate school. Participants are given a stipend of $2750, up to $450 for travel to BYU, free housing during the 8-week program, and a $400 travel allowance to attend a conference during the following academic year to present their research. Also, we provide participants with skills that will help them in their research and in graduate school. To do this, we offer training sessions in computers, seminars on needed research skills, and discussions on graduate school. Topics for discussion about graduate school can include: “Common misconceptions about graduate school in mathematics”; “What you should do now to prepare for graduate school”; “Math organizations that graduate students should be aware of”; and “Attending conferences, giving presentations, and publishing research.” Finally, we provide some social and recreational activities that foster interaction and collaboration in a relaxing environment. More information is available at the REU web site [http://math.byu.edu/reu/](http://math.byu.edu/reu/). The 2007 program consisted of three research groups investigating research problems in geometric optimization with Denise Halverson; mathematical finance with Scott Glasgow; and Minimal surfaces with Michael Dorff. Our REU program has developed a national reputation. In 2007 we had 91 applicants from 80 different universities and colleges across the U.S. and we selected 12 participants. The reputation of the BYU Summer Mathematics REU continues to grow and already in March 2008 we have received over 120 applications for our 2008 summer program (contrast this with a neighboring institution which last year received only about 12 applications for their REU).

**BYU Mathematics Majors Involved in Mentoring** The number of students involved in mentored research increased by 50% this year, from 26 in 2006 to 39 in 2007. The number of students presenting at the Spring Research Conference also increased by 23%, from 31 to 38. We expect these numbers to continue to increase in the future.

**BYU Math Department Undergraduate Mentoring** We have several faculty members doing one-on-one research with students, and several larger groups of student researchers, including the Tropical Geometry group, the Quantum Singularities group, the Stochastic Differential Equations group, the Dynamical Systems group, the “Harmonic Mapping and Minimal Surfaces” group, and the Information and Decision Algorithms group.

**Activities and Support for Undergraduates** In 2006, as part of our increased emphasis on providing undergraduate students with an excellent education, we started a new Undergraduate Colloquium series, we improved our support for the Putnam Exam, and we began implementing a formal advisement program for our majors. We have continued these activities and have worked to improve them throughout 2007.

**Undergraduate Colloquium** In 2007 we continued the Undergraduate Colloquium Series that we began in 2006. We feel it is essential that students have the opportunity to learn about the latest developments in the field and to get a real sense of the opportunities and exciting aspects of mathematics. To address this, speakers for these colloquia are specially chosen to be both noted mathematicians (either in academics or in industry) and skilled in explaining mathematics at a level that nonmathematicians can understand. We further instruct speakers to present their talk at the level of an undergraduate. We try to have three of these nationally-known speakers come each semester.

In 2007, we had John Milnor of Stony Brook University, Kenneth Ribet of the University of California, Ken Ono from the University of Wisconsin, Michael Rosen from Brown, and James Yorke of the University of Maryland.
**Putnam Exam** In March 2006, we started a department-level contest similar to the Putnam in order to encourage students to participate in the Putnam exam and in order to select our best students for our national Putnam team. Darrin Doud has also spent many hours working with students, teaching, coaching, and encouraging them. The new department-level contest, combined with special recruiting and coaching for students by Darrin Doud, resulted in our being ranked 33 out of 413 teams in the US and Canada in 2007.

**Advising Majors** In 2007 we continued that formal advising and were able to meet with a large percentage of the students. We have also been conducting exit interviews with all of our majors to assess how we are doing at achieving our learning outcomes and to try to recognize and weaknesses of our programs. David Wright and Rod Forcade have done the majority of this advising, but many other faculty members have helped.

**Major Field Test** As part of our learning outcomes assessment, our students began taking the Major Field Test in 2007. This is a comprehensive nationwide exam covering most of the standard undergraduate level mathematical curriculum. A total of 238 other institutions participated in the exam, and both the mean and median scores for all institutions were 154 (out of 200 possible) with a standard deviation of 9. The mean for our students taking the exam was 185, putting us well above the 95th percentile (the highest reported).

**Scholarship Productivity and other Indicators** We try to measure scholarly productivity in at least two ways: number of pages appearing in peer-reviewed publications per research faculty member and number of publications per research faculty member. The total number of pages published per faculty member has steadily increased from 9 in 2003 to 23 in 2007—more than a 250% increase. The number of publications divided by the number of research faculty also increased from 0.8 in 2003 to 1.2 in 2007. This is slightly down from 2006, but the pages per faculty member is much higher than in 2006, so this means that faculty are writing more than they did in 2006, but publishing in longer articles. Finally, the percentage of research faculty who published something in 2007 was 70%, which was the same as 2005 and 2006, but higher than 2003 and 2004.

**External Funding** External funding has increased a great deal in 2007. In 2007 we received $2,592,971, much of which was granted to support undergraduate research mentoring and other educational projects, but several faculty also received new research grants in 2007, including Michael Dorff (NSF), Kening Lu (NSF), Jessica Purcell (NSF), and John Dallon (NSF). Several faculty had ongoing grants, and many more proposals were submitted in 2007 and are still in review. About 1% of research-active mathematicians are funded by the National Science Foundation in any given year. It is, therefore, noteworthy that, in addition to our educational and mentoring grants, 10% of our faculty received new NSF research grants this year, and a total of 20% of our faculty have external funding for research.

**Invited and Externally Funded Leaves** One of our newest faculty members, Jessica Purcell, was invited to spend the academic 2007–2008 year at Oxford University working with a leader in her field, Mark Lackenby. This leave was mostly funded by Oxford University. John Dallon was also invited to spend the 2007 calendar year at Penn State University Medical School to share his expertise in the mathematical modeling of wound healing and to learn more about the biology of wound healing. This leave was funded by a grant from the National Science Foundation. Wayne Barrett was invited to spend four months at the Israel Institute of Technology (Technion) in Winter Semester 2007. This leave was funded by a Fulbright award. Finally, Greg Conner was invited by the Slovenian ambassador for science to spend the 2007–2008 academic year at the University of Ljubljana. This leave was partially funded by a Fulbright award, as well as a grant from the Slovenian Ad Futura foundation.

**Awards and recognitions**

**Karl G. Maeser Distinguished Faculty Lecturer** Kening Lu, who is well known as an international expert on infinite-dimensional dynamical systems, was recognized with the University’s highest honor, the Karl Maeser Distinguished Faculty Lecturer.

**Editorships** Two of our faculty were asked to serve on editorial boards this year. David Wright is an Associate Editor for the *Rocky Mountain Mathematics Journal*, which endeavors to publish significant research papers and substantial expository/survey papers in a broad range of theoretical and applied areas of mathematics. Kening Lu was asked to serve on the editorial board of the *Journal of Differential Equations*. He started serving on this board in August of 2007. The Journal of Differential Equations is ranked by the Science Citation Index 14th among all mathematics journals (according to impact factor).
**Fulbright Honors** According to the Institute of International Education, the BYU Mathematics Department has received more Fulbright Awards than any other Mathematics department in the nation in the last eight years. Within the field of mathematics in the past three years, only 18 Fulbright Scholars were selected, and of these, three were awarded to BYU Mathematics professors. Professors Gregory Connor, Wayne Barrett, and Michael Dorff were selected as Fulbright scholars in 2007, 2006, and 2005, respectively. … Among all the thousands of universities and hundreds of thousands of faculty to choose from, the United States Department of State selected these three professors from BYU to be recipients of the Fulbright Award. This choice shows the quality of teaching, depth of knowledge, and future potential of these outstanding faculty at BYU.

**Enrollment Trends**

**Total Enrollments** Total enrollments in mathematics courses in 2007 were up by 3.5% over the previous year. We believe that the main factors driving this increase are:
1. Our focus on improving the quality of our lower division service courses.
2. Increased capacity in Fall 2007 due to the completion of the JKB.
3. A general trend, nationwide and across many disciplines, toward using more mathematics.

At the end of 2006, and in early 2007 we made a number of changes to improve our undergraduate service courses, including changing the calculus text, clarifying learning outcomes, and changing who was assigned to teach lower-division service courses. Specifically, we have tried to make teaching assignments that better reflect faculty teaching strengths. We have made a special effort to assign faculty who have been most recognized for successful lower-division teaching into lower division service courses. We do not expect any of these factors to change significantly in the near future. We have an ongoing focus on further improving the quality of our lower division service courses, and we expect that demand for mathematics will continue to increase. Thus we expect to see total enrollments continue to increase in the next several years.

**Major Enrollments and Recruiting Efforts** We began significant recruiting efforts for our major in 2007, but those efforts were not fully implemented until the end of the year. Thus, it is not too surprising that we did not see an increase in majors in 2007. Although the number of math majors graduating in 2007 was up slightly, the number of major enrollments was slightly down from 2006. However, in Winter 2008 we had 67% more new math majors than we did in Winter 2007 (55 in Winter 2008 compared to 33 in Winter 2007). This gives us reason to believe our recruiting efforts are starting to bear fruit and will significantly increase the total number of math majors and math enrollments in the near future, provided we can maintain or improve our current retention.

**Space** In conjunction with the move of Math Education to the first floor of the Talmage building and thanks to the generous help of the dean’s office and the Statistics Department, we were given substantial new lab space to use for mentored research (273 TMCB and office space to free up 307 TMCB). We were also given several new offices that we can remodel to use for additional lab space and we were able to consolidate our office space to be contiguous. Additional space has been promised us that will probably meet most of our short-term needs, including a conference room (301 TMCB) and a remodeled office complex (using 275 TMCB and adjacent offices). Dean Sommerfeldt’s plan for an expanded TMCB will probably meet all of our long-term space needs as well. We are very grateful to the dean’s office, the Statistics Department, and the university for the new space we were granted, and we are confident that it will help us be more effective.

**Personnel**

**New hires: Faculty** In 2007 we hired three new permanent-track faculty: Todd Fisher, Jessica Purcell, and Robin Roundy. All three are excellent teachers and scholars, and we expect that they will make a significant contribution to BYU. Robin Roundy was a distinguished senior faculty member at Cornell who gave up his position at Cornell to be a mission president, so although he was hired in 2007, he will not actually join our faculty until July 2010.

**New hires: Staff** We also hired a new staff member in 2007. Teisha Vest is our new business manager and she has already done a wonderful job of improving the service that our staff give the faculty and helping the department run more efficiently.

**Retirements** We had two retirements this year: Leri Smith retired as Administrative Assistant, and Lynn Garner retired from the faculty.
**Scholarships** Until this year we had only one scholarship for math majors—the Harvey Fletcher scholarship. The endowment for this scholarship was no longer large enough to pay more than about half tuition for a single semester, so we did not have even one full scholarship in the department for math majors. However, this year a generous donor endowed a new full-tuition full-year scholarship for math majors. Using royalties from our independent study courses, we were able to supplement this donation with enough funds to endow a second full-tuition full-year scholarship. Our first recipient of one of these scholarships is Pedro Acosta, one of our strongest students. As a Chilean citizen, Pedro had to give up his right to work in the United States in order to go on an LDS mission. This scholarship will help ensure that he will have the funds he needs to complete his education at BYU.

**Challenges** Our main ongoing challenges are:
1. A small number of faculty with increasing demands on faculty resources.
2. Handling the logistical and other problems arising from having 30% of our courses taught by faculty in another department.
3. Difficulty finding qualified students to work as TAs, graders, and Math Lab tutors.

**Mathematics Majors and Graduates**

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Majors</td>
<td>157</td>
<td>178</td>
<td>164</td>
<td>195</td>
<td>203</td>
<td>190</td>
</tr>
<tr>
<td>Graduates During Year</td>
<td>28</td>
<td>36</td>
<td>40</td>
<td>30</td>
<td>38</td>
<td>42</td>
</tr>
</tbody>
</table>

**Graduate Degrees**

**April 2007**

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis/ Project Title</th>
<th>After Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell, Thomas</td>
<td>Classification of the Isoperimetric Surfaces in $\mathbb{S}(E) \times \mathbb{R}$</td>
<td>PhD at the University of Oregon</td>
</tr>
<tr>
<td>DeWaal, Nicholas</td>
<td>The Importance of the Riemann-Hilbert Problem to Solve a Class of Optimal Control Problems</td>
<td></td>
</tr>
</tbody>
</table>

**August 2007**

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis/ Project Title</th>
<th>After Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penrod, Keith</td>
<td>Infinite Product Groups: Including Symmetric Groups and Braid Groups</td>
<td>PhD University of Tennessee at Knoxville</td>
</tr>
<tr>
<td>Peterson, Aaron</td>
<td>Pipe Diagrams for Thompson’s Group</td>
<td>Ratheon</td>
</tr>
<tr>
<td>Simmons, William</td>
<td>Super Models: Several Concepts and Applications of Model Theory</td>
<td>PhD University of Illinois, Chicago</td>
</tr>
<tr>
<td>Taylor, Stephen</td>
<td>On Connections between Univalent Harmonic Functions, Symmetry Groups, and Minimal Surfaces</td>
<td>PhD, SUNY Stonybrook in Math Physics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PhD</th>
<th>Dissertation Title</th>
<th>After Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grout, Jason</td>
<td>The minimum rank problem over finite fields</td>
<td>Postdoc at Iowa State</td>
</tr>
</tbody>
</table>

**December 2007**

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis/ Project Title</th>
<th>After Graduation</th>
</tr>
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<tbody>
<tr>
<td>Carlile, Kerri</td>
<td>Decoding Wiener, Boneh and Durfee: An Explanation of Attacks on Small Decryption Exponents in RSA</td>
<td></td>
</tr>
<tr>
<td>Evans, William</td>
<td>Investigating Poincaré Reversibility in Approximations to Irreversible Systems Using a Vector Riemann-Hilbert Approach</td>
<td>PhD in Physics. U of IL, Urbana</td>
</tr>
<tr>
<td>Tyler, Jonathan</td>
<td>Analysis and Implementation of High-Order, Centered Compact Finite Difference Schemes</td>
<td>Instructor BYU-Idaho</td>
</tr>
</tbody>
</table>

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Report on College Research Funds

The following Faculty had partial support:

Report on Undergraduate Mentoring

WINTER 2007

DARRIN DOUD:
Student: Kevin Powell; Project Title: Singly ramified Galois extensions.
Student: Wayne Rosengren; Project Title: Diophantine equations related to the ABC conjecture.
Student: Russell Ricks; Project Title: LLL-reduction and a conjecture of Gunnells

RODNEY FORCADE:
Students: Heather Farley, Kevin Powell and Ben Warner; Project Title: Cryptography

CHRISTOPHER GRANT:
Student: Quinten Christensen; Project title: Optimizing Valve Geometries for a Small Scale Pump

STEPHEN HUMPHRIES:
Students: Kayla Barnes and Nathan Perry; Project title: Braid groups and free groups

KENING LU:
Student: Yi Luo; Project title: Numerical solutions for pricing of spread options

TIANCHENG OU-YANG:
Student: Skyler Simmons; Project title: Numerical computation of n-body problem

VIANEY VILLAMIZAR:
Student: James Taylor; Project title: Elastic Scattering from High Reynolds Number Fluid-Filled Cavities.

SPRING/SUMMER 2007

ROGER BAKER:
Students: Sam Corson and Kevin Powell
Results or progress, student papers, and student presentations: The students were able to improve a conditional theorem of Sid Graham and Janos Pintz about the number of cube-free integers up to x. (The Riemann hypothesis is assumed, hence ‘conditional’) They obtained a new bound for the error term in the asymptotic formula. This result will be presented by Kevin Powell at the Spring Research Conference.

JEFFREY HUMPHREYS:
Students: Keith Rudd, Blake Barker, Tom Roderick
Results or progress, student papers, and student presentations: Keith finished and is now a graduate student at Northwestern. Blake is now a graduate student in our department. Together we coauthored 2 papers in our group and both presented at the SIAM Snowbird conference in May. There are two other projects underway that both have contributed on. Tom Roderick is working on developing a database of interest rates from overnight LIBOR to 30-year treasuries. This is part of a long-term project to understand yield curve dynamics in the fixed income market.

TYLER JARVIS:
Students: Nathan Grigg, Natalie Wilde, Mark Kempton
Results or progress, student papers, and student presentations: Nathan Grigg finished writing the paper “An Elementary Proof of the Fundamental Theorem of Tropical Algebra.” This has been posted on the arXiv and will be submitted for publication soon. He also finished his honors thesis on factoring multivariable tropical polynomials. Natalie and Mark worked on problems in topical linear algebra, and they have found a proof of the tropical rank-nullity theorem and will be writing it up shortly.
ERIC SWENSON
Student: Russell Ricks
Results or progress, student papers, and student presentations: We worked on a special case of Ballmanns conjecture: Namely when there is a unique closed minimal invariant subset of the boundary. We have discovered a number of properties such a set must have, but haven’t yet obtained a marketable result. We hope to have such a result soon.

TIANCHENG OUYANG:
Student: Skyler Simmons, Yang Yu
Project title: Numerical computation of n-body problem
Results or progress, student papers, and student presentations:
1. Computation software: (Skyler Simmons) Study the structure of 3D computation and simulation in Java. Simulate the orbits (including periodic and non-periodic orbits) and simulate bi-collision behavior of orbits.
2. Numerical computation of n-body problem in Matlab. (study numerical simulations in Matlab study N-body problem and modify comment the existing programs)
3. Study Dynamical system and Hamiltonian system.

VIANEY VILLAMIZAR:
Student: James Taylor
Project title: Elastic Scattering from High Reynolds Number Fluid-Filled Cavities.
We continue our work on elastic scattering from spherical and cylindrical inclusions. Our work for spherical cavities is finished now. We are writing a paper that is well-advanced and hope to submit it to an International Journal by the end of this Fall semester.

Student: Sebastian Acosta
Project Title: Elliptic Grid Generation with Adaptive Control Functions
During last summer (2007), we developed an alternative to the BCGC algorithm developed and implemented in references [2, 3]. The new elliptic grid generator incorporates the control functions into the governing quasi-linear system of equations as unknowns. Smooth and non-overlapping grids are generated. They are used in numerical simulation of scattering problems using finite difference explicit methods. These grids serve to establish better stability properties for the PDE equations modeling the scattering problem. On July 2007, I presented our results [3] at the international conference ICIAM07 that was held in Zurich. Also, I presented our paper [4] in the prestigious conference Waves07 held at University of Reading, UK on July 2007. It was accepted for the peer-review Proceedings of this conference on May 2007.

Fall 2007

ROGER BAKER
Student: Kevin Powell
Results or progress, student papers, and student presentations: The students were able to improve a conditional theorem of Sid Graham and Janos Pintz about the number of cube-free integers up to x. (The Riemann hypothesis is assumed, hence ‘conditional’.) They obtained a new bound for the error term in the asymptotic formula. This result will be presented by Kevin Powell at the Spring Research Conference.

MICHAEL DORFF:
Student: Tina Benhaim and Amanda Clingerman
Results or progress, student papers, and student presentations: We have investigated some topics in complex analysis, minimal surface theory, and harmonic mappings. The students are working on the following problem: We connect ideas from minimal surface theory with results about planar harmonic mappings in geometric function theory. Specifically, using the Weierstrass-Enneper representation for minimal surfaces, we classify the minimal surfaces in $\mathbb{R}^3$ corresponding to the lifting of the canonical harmonic mappings $f = h + g^{-}$ that are shears of analytic mappings with dilatation $g'(z)/h' = (z)^3$.

DARRIN DOUD:
Students: Minh Nhat Do and Ben Warner
Results or progress, student papers, and student presentations: During Fall 2007 I worked with Minh Nhat Do and Ben Warner on undergraduate research. They began a computational study of relationships between Hecke eigenvectors in arithmetic cohomology groups and Galois representations. They were able to use prewritten software to do exhaustive computations of arithmetic cohomology, which they are currently working
to associate with Galois representations. They will be presenting their work in the Spring Research Conference in March.

CHRISTOPHER GRANT:

Student: Quinten Christensen

Project title: Optimizing Valve Geometries for a Small Scale Pump

Results or progress, student papers, and student presentations: Quinten is involved in the mathematical modeling of a multiscale pump design that will eventually produce differential equations that will be solved numerically to determine optimal valve lengths and membrane hole geometries. Quinten is just beginning his research, and his work to date has mainly involved studying the background physics in consultation with the pump’s original designer, Aaron Astle. In addition, he has conducted preliminary investigation of applicable numerical schemes. This project represents Quinten’s Honors Thesis, and he will be continuing to work on it through the coming year.

KENING LU:

Student: Basil Williams

Results or progress, student papers, and student presentations: Basil Williams was working on computational simulation of European spread option and parameter estimations. He will give a presentation at the college Spring research conference.

TIANCHENG OUYANG:

Student: Skyler Simmons

Results or progress, student papers, and student presentations: Simulation of N-body problem of celestial mechanics. Using Matlab the student optimized the variational problem for searching the 3D periodic orbits. The results will be present on the Spring conference.

ERIC SWENSON:

Student: Russell Ricks

Results or progress, student papers, and student presentations: We have been working on the subject of CAT(0) space admitting geometric actions. The long-term goal is the rank rigidity question of Ballmann. We have been working on a technical issues for CAT(0) spaces.

VIANEY VILLAMIZAR:

Student: James Taylor

Project Title: Elastic Scattering from High Reynolds Number Fluid-Filled Cavities.

Results or progress, student papers, and student presentations: We continue our work on elastic scattering from spherical and cylindrical inclusions. Our work for spherical cavities is finished now. All the computations inside the fluid filled cavities using Singular Perturbation techniques were performed. James wrote a good portion of a paper that is well advanced and we hope to submit it to an International Journal by the end of February 2008.

Student: Sebastian Acosta

Project Title: Elliptic Grid Generation with Adaptive Control Functions (Topic: Elliptic Grids Preserving Cell Area and Line Spacing and its Application to Multiple Scattering)

Results or progress, student papers, and student presentations: During last year (2007), we developed an alternative to the BCGC algorithm developed and implemented in references [1, 2]. The new elliptic grid generator incorporates the control functions into the governing quasilinear system of equations as unknowns. Smooth and non-overlapping grids are generated. They are used in numerical simulation of scattering problems using finite difference explicit methods. These grids serve to establish better stability properties for the PDE equations modeling the scattering problem. On December 2007, I submitted a paper [3] containing our results. Partila results of his paper were presented at the international conference ICIAM07 held in Zurich on July 2007. Also, I presented our paper [4] in the prestigious conference Waves07 held at University of Reading on July 2007. It was accepted for the peer-review Proceedings of this conference on May 2007.
**Scholarship**

**Chapters in Books**

DALLON, JOHN CARLILE: Models with Latticefree Center-based Cells Interacting with Continuum Environment Variables, Single-Cell- Based Models in Biology and Medicine, Birkhäuser- Verlag No 23, 06/2007.

**Proceedings**


**External Grants**

Chow, Shue-Sum, University of Iowa, $900.00, Travel grant for NSF-CBMS REGIONAL RESEARCH CONFERENCE

Dallon, John Carlile (H.P. Ehrlich, E. M.Woolley), NSF $99,982.00, Mathematical Differentiation between Two Types of Wound Healing: Regenerative Repair versus Repair, Resulting in Scar.

Dorff, Michael John (J. Lewis, and S. Muir), NSF $14,800.00, Conference on One and Several Complex Variables.

Dorff, Michael John (K. Stephenson, R., Stankewitz, L. Schaubroeck, M. Brilleslyper, and J. Rolf), NSF $137,391.00, Monograph on Complex Analysis, Research Topics.

Doud, Darrin M, NSA $22,000.00, Boundary cohomology and reducible Galois representations

Fisher, Todd (L. Bakker, K. Lu, and D. Rudolph), NSF $18,900.00 Rocky Mountain Dynamical Systems Conference.

(M. Dorff (PI), S. Glasgow (Co-PI), D. Halveron (Co-PI), G. Lawlor (Co-PI)), NSF $160,000.00 REU Site: Brigham Young University, Undergraduate Research Experiences in Mathematics.

Halverson, Denise M, (Dušan Repovš (P.I.)), Slovenian government $1,400.00 Travel grant.

Halverson, Denise M, (Michael Dorff (P.I.)) NSF $159,000.00, REU Site: Brigham Young University, Undergraduate Research Experiences in Mathematics.

Humpherys, Jeffrey C (Jeffrey Humpherys) National Science Foundation, DMS $152,206.00, Stability of Traveling Waves.

Humpherys, Jeffrey C (Jeffrey Humpherys and Sean Warnick) National Science Foundation, DMS $704,848.00 CSUMS: Information and Decision, Algorithm Laboratories (IDeA Labs)

Jarvis, Tyler, National Science Foundation $91,204.00 Stringy invariants, orbicurves, and topological field theory.

Jarvis, Tyler J (Michael Dorff, Denise Halverson, Jeff Humphreys) National Science Foundation $1,262,854.00, Center for Undergraduate Research in Mathematics.
Li, Xian-Jin NSA $15,851.00, Topics related to the Selberg trace formula, and the Beurling Selberg extremal functions.

Lu, Kening, NSF $168,000.00 Theory and Applications for Infinite Dimensional Dynamical Systems.

Lu, Kening, NSF $270,000.00 Topics in Finite and Infinite Dimensional Random Dynamical Systems.

Purcell, Jessica, National Science Foundation, $93,848.00, Geometry and topology of knots and Links.

Wright, David Grant, National Science Foundation (Math Sciences Research Institute) $1,000.00, BYU Math Circles.

Wright, David Grant, (Ric Ancel, Craig Guilbault (U of Wisconsin, Milwaukee); Gerard Venema (Calvin College); Fred Tinsley (Colorado College); Dennis Garity) National Science Foundation $36,750.00, Geometric Topology Workshop.

**Major Seminar** In 2007, through the help of our Student Advisor Committee, we realized that many of our students were unaware of the many career opportunities in mathematics, and most students were also unaware of the many internship, REU, scholarship, and other opportunities for math majors before graduation. In response to that need, we developed a 1-credit seminar for majors (now called Math 221). As part of the seminar we invite alumni speakers to discuss career options with our students, we also have a panel of faculty and graduate students talk about graduate school in mathematics. The seminars first began in Fall 2008 and the speakers that semester were (1) Greg Newton, a lawyer, on Oct 2; (2) Michael Cannon, a medical researcher, on Oct 9; (3) David Andrist, an actuary, on Oct 23; and (4) Nephi Noble, who works for the National Security Agency, on Dec 4. This first year of the seminar was very successful—students indicated that they had learned a great deal and were better aware of what their options and opportunities were for the future. The talks by alumni on careers were open to the general campus community and were very popular—usually generating an audience of over 100.

**From the Annual Report for 2008–2009**

**Special year in dynamical systems** To help faculty stay abreast of their field of research, and to further develop connections and collaborations, we have begun what we call a “special year” program. Each academic year we choose a research area closely connected to several faculty members’ current work and focus some of our travel and research funds on bringing many leading researchers in that area to BYU to speak to and collaborate with our faculty. In 2007–2008 the topic was dynamical systems. The primary faculty involved in this were Kening Lu, Todd Fisher, Tiancheng Ouyang, and Lennard Bakker. Through the special year they were able to make new collaborations as well as expand collaborations with previous coauthors. They were also able to highlight the work done by faculty at BYU. Below are a few highlights in three major areas: publications in peer reviewed papers, visitors, and a conference.

**Papers:** Ten (2 Bakker, 3 Fisher, 4 Lu, and 1 Ouyang) peer-reviewed papers have appeared or should soon appear from collaborations during the special year. Most of these collaborative works would have either taken significantly longer to produce or never been published if not for the special year funds. This does not include papers that were written by sole authors or that were not affected by the special year funds.

**Visitors:** As part of the special year we brought visitors to BYU from the US, Uruguay, France, Portugal, Brazil, England, and China. All of the visitors gave talks in seminars and 4 colloquium talks were given.

**Conference:** In May there was a weeklong conference held at Park City Utah. The conference was supported an NSF grant, with some additional support coming from the BYU Math Department. Over 50 participants attended the conference; the attendees were mixed between graduate students (including 4 from BYU), junior mathematicians, and senior faculty. The feedback we had was very positive. The talks were of the highest caliber—a fact commented on by many attendees. Additionally, there have been a number of inquiries into when we would host the next conference.

In 2008–2009 the topic for the special year is topology. We will provide a report on the results of that special year in the 2009 annual report.
External Funding  
External funding in the department has increased a great deal in the past few years. In 2008 we had new and ongoing grants totaling $2,512,750, which we have been able to use to substantially strengthen our department and help our students. Much of this funding was granted to support undergraduate research mentoring and other educational projects. Many grants were continuing from previous years; additionally, our NSF-sponsored Summer REU was renewed in 2008. Many proposals submitted in 2008 are still pending. The total number of proposals submitted this year was 20, which is a small increase over 2007 (when 17 proposals were submitted), and a large increase over 2006 (when only 4 proposals were submitted). A total of 47% of our faculty either submitted a proposal for funding or had ongoing funding. Until only recently, we normally had only about 10% to 15% of our faculty who had funding or were writing grant proposals.

Invited and Externally Funded Leaves  
One of our newest faculty members, Jessica Purcell, was invited to spend the academic 2007–2008 year at Oxford University working with a leader in her field, Mark Lackenby. This leave was mostly funded by Oxford University and resulted in approximately five papers being submitted to tier-one journals. In Fall of 2008, Bill Smith took a leave to Paris to work on a research monograph. All of his travel expenses were paid by external funds. Finally, Greg Conner was invited by the Slovenian ambassador for science to spend the 2007–2008 academic year at the University of Ljubljana. This leave was partially funded by a Fulbright award, as well as a grant from the Slovenian Ad Futura foundation.

Faculty Awards and Recognitions  
We have many outstanding faculty in our department, and this year a few of them were recognized with awards from the college, the university, or from professional associations. These include:

- College Distinguished Citizenship Award: Michael Dorff
- College Excellence in Teaching Award (10+ years): Christopher Grant
- MAA Intermountain Section Award for Distinguished College or University Teaching of Mathematics: Michael Dorff. This award honors college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions.
- BYU Alcuin Fellowship: Darrin Doud. The Alcuin Fellowship recognizes faculty who are especially effective in general education courses. The appointments are for three years and carry with them an annual salary stipend of $2,000 as well as $4,000 in annual research support funds.

Recruiting Efforts and Enrollments  
We began significant recruiting efforts in 2007, but those efforts were not fully implemented until 2008. We have focused both on recruiting high school students to BYU and on recruiting non-math majors at BYU into the major. We have also taken steps to improve retention of majors, for example, through the major seminars and major advising. Those efforts are beginning to bear some fruit, as the number of math majors increased by 10% in 2008, from 187 to 206. The number of math minors has increased even more dramatically, by 47% in 2008 from 344 to 506. We expect to see numbers of both majors and minors continue to increase as our recruiting and retention efforts continue and as students begin to recognize the many benefits that a math degree offers.

From the Annual Report for 2009–2010

CURM  
Our National Center for Undergraduate Research in Mathematics (CURM) finished its second full year of operation in 2009. CURM helps undergraduate students at universities and colleges throughout the U.S. begin and succeed at doing undergraduate research. During the past two years, 56% of CURM students were female and 31% were from under-represented minority groups. Often, these CURM supported students and professors are at institutions that want to encourage undergraduate research but have a current infrastructure that inhibits a professor from initiating and succeeding in mentoring students in undergraduate research; such inhibitors include heavier professorial teaching loads, a non-research emphasis, minimal financial support for research, and students from underrepresented groups or first generation college students. Results from the past two years (2007-2009) which consisted of 29 professors from universities across the U.S. working with 91 undergraduates at their university include:

- 34 research papers authored or co-authored by undergraduates
- 89 oral research presentations given by undergraduates
- 23 poster presentations given by undergraduates

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In addition to this program, Michael Dorff, the director of CURM, organized the joint 2009 CURM/MAA (Mathematical Association of America) Intermountain Region Spring Conference on March 20-21, 2009 at BYU. The joint conference included presentations of research done by 97 students from colleges and universities across the country, 41 additional presentations by professors, and attendance of about 250 people including a group of 50 gifted and talented students from a local public school. In addition, there were invited addresses by Laura Taalman (James Madison Univ.) on mathematics and Sudoku puzzles, Colin Adams (Williams College) on knot theory, and Joe Gallian (Univ. of Minnesota, Duluth, and past president of the MAA) on symmetry patterns. The conference and speakers were featured in a video segment on BYU Weekly.

**IMPACT Program and CSUMS Grant** In 2009, the NSF-funded Interdisciplinary Mentoring Program in Analysis, Computation, and Theory (IMPACT) commenced its third year. This year-long program centers on interdisciplinary research in mathematics, statistics, and numerical computation. The thematic research areas for the 2009-2010 academic year are: Actuarial, Investment, & Management Sciences (AIMS), Functional Data Analysis, Mathematical Systems & Optimization, and Nonlinear Waves and Coherent Structures, Computational Biology & Bioinformatics, and Geoscience Applications.

Items of note for 2009:

- IMPACT sent students to conferences in St. Louis (American Controls Conference) and Denver (SIAM Annual Meeting) to present their research.
- The National Science Foundation extended the CSUMS grant for one year, thus providing funds for IMPACT through Summer 2011.
- One of the co-directors of the program, Jeffrey Humpherys, received an NSF CAREER Award from the National Science Foundation to continue his research in stochastic dynamics and nonlinear waves and coherent structures with (mostly) graduate students in the program. At the time of this writing, the IMPACT Program consists of 28 students (21 undergrads and 7 grads) and 9 faculty representing 4 departments in the College of Physical and Mathematical Sciences. For more information see impact.byu.edu or contact Jeffrey Humpherys (Mathematics) or Shane Reese (Statistics).

**NSF Sponsored Research Experience for Undergraduates (REU)** Also related to our efforts in mentoring is our NSF sponsored Research Experience for Undergraduates (REU) in Mathematics co-directed by Michael Dorff and Denise Halverson. The BYU Mathematics REU just completed its fifth year and was renewed by the NSF for four more years. The program’s goals are to (a) involve undergraduate students in mathematical research; (b) encourage undergraduate students, especially women and students from Principally Undergraduate Institutions (PUIs), to attend graduate school in mathematics; and (c) prepare participants to be successful in graduate school. Typically, the BYU REU involves 12 undergraduate students, 60% female and 75% from PUIs. All undergraduate participants write a research paper and present their results at a national meeting. More information is available at the REU web site math.byu.edu/reu. For the 2009 REU program, there were 138 applicants from undergraduates from over 100 different universities and colleges throughout the U.S. The following 12 participants were chosen:

1. Jessica Bentz, Univ. of Arkansas
2. Elena Caffarelli, Canisius College
3. Sam Ferguson, UNC Chapel Hill
4. Laura Graham, Miami Univ.
5. Ryan Jensen, BYU
6. Cami Jepsen, BYU
7. Robert Lang, Florida Atlantic Univ.
8. Emily McHenry, Xavier Univ.
9. Kyra Moon, BYU
10. Curtis Nelson, BYU
11. Gina Shero, Clarion Univ. of Penn.
12. Melissa Yeung, Univ. of Chicago
The 2009 REU participants produced 5 student authored research papers, 7 student presentations at national conferences with 5 of the presentations winning awards for top presentations out of the 119 presentations, and 3 poster presentations at national conferences with 1 winning an award for one of the top poster presentation out of the 250 posters presented. The BYU REU is quickly gaining a reputation as a challenging and successful program. It is not uncommon for non-LDS participants in our REU to be accepted in several other REU’s and chose our REU over the others. The REU has also had a powerful effect in helping students transition to graduate study in mathematics. Of the undergraduate students in the BYU REU, most stated that before the REU they were unsure about attending graduate school in mathematics, but after completing the BYU REU, 86% have actually gone onto graduate school in mathematics (89% of the women and 100% from PUIs).

BYU Students Involved in Mentored Mathematics Research According to the former president of the Mathematical Association of America, Joe Gallian, the BYU Mathematics Department has more undergraduate students involved in mentored research than any other Mathematics Department in the country. And the number of students involved in undergraduate research in the Math Department has increased by 44% this year; from 54 in 2008 to 78 in 2009. We have many faculty members doing one-on-one research with students, and several larger groups of student researchers, including the S-ring Group, the Minimum Rank Group, the IMPACT Program, the Computational Number Theory Group, the Geometric Optimization Group and the Quantum Singularities Group.

Undergraduate Colloquium In 2009 we continued the Undergraduate Colloquium Series that we began in 2006. We feel it is essential that students have the opportunity to learn about the latest developments in the field and to get a real sense of the opportunities and exciting aspects of mathematics. To address this, speakers for these colloquia are specially chosen to be both noted mathematicians (either in academics or in industry) and skilled in explaining mathematics at a level that non-mathematicians can understand. We further instruct speakers to present their talk at the level of an undergraduate non-major. We try to have at least three of these nationally known speakers come each semester. In 2009, our speakers were Gilbert Strang, Massachusetts Institute of Technology; Hugh Montgomery, University of Michigan; Andy Pollington, National Science Foundation; Art Benjamin, Harvey Mudd College; and Carl Pomerance, Dartmouth. Students seem to like the talks and attendance is usually high (we often fill 1170 TMCB which has a capacity of about 200). Because of their national reputation as speakers, and because our series has developed a reputation for being interesting and understandable, these speakers attract many people from other colleges and universities.

Putnam Exam and Intermountain Math Contest Our ongoing efforts in recruiting and coaching students resulted in the BYU Putnam Team’s placing 24th out of 546 institutions in the US and Canada. We had many students participate in the exam and many of them scored very well.

We also expanded our annual BYU Mathematics contest into an Intermountain Mathematics Contest. Students from BYU and the U of U competed. The winning student was Peter Baratta, from BYU, who earned 40 points, there was a 5-way tie for second place, with three students from BYU and two from the U of U earning 20 points. We hope eventually to expand participation in the Intermountain Mathematics Contest to include many schools in the region, and we hope to have most of our majors and many non-majors across campus participate in both the BYU/Intermountain Math Contest and the Putnam Exam each year.

Tracking and Advising Majors We noticed in 2006 that most of our majors were not getting any formal advisement from faculty. Since then we have developed a formal system of tracking our majors and scheduling regular meetings for them with faculty advisors. We have also been conducting exit interviews with all of our majors to assess how we are doing at achieving our learning outcomes and to try to recognize strengths and weaknesses of our programs. Student feedback about our program is very positive about the program and is helpful for us as we strive to further improve. All students are invited to meet with faculty each semester to get help in planning their programs of study and exploring their career options.

Students did not immediately respond to these invitations. In Fall 2008 we had only a third of our math majors come in for formal counseling, many others appreciating the opportunity but feeling they were close enough to graduating that they would no longer need this service. But in winter of 2009 that number rose substantially to exactly 50%. This last fall was our best semester yet with a dramatic increase of 24% as nearly three quarters of our growing body of math majors met with advisors. We feel that this ongoing advisement effort has not only helped students graduate faster and prepare better for their long-term career goals, but it has also improved retention of our majors.
Career and Internship support for Students

It has become very clear lately that many students are unaware of the outstanding career and internship opportunities available to math majors. Our efforts for educating prospective majors are outlined in the section Outreach, below. But we also have taken several important steps to help our current majors be more aware of these many opportunities. These include

1. Substantially increasing our staff support for finding and advertising internships, REUs, fellowships and scholarships, and job opportunities for math majors, and
2. Offering a “Careers in Mathematics” seminar in the Fall.

New support for Internships and Other Opportunities

In the past, a small number of students in the department have participated in internships; these internships were not organized by the department and earned the students no academic credit. This is typical of mathematics departments around the country. Indeed, we know of no mathematics departments that have any support for student internships. In 2009 we took steps to substantially change this.

1. We hired a student employee who has had experience with internships to help identify, advertise, and facilitate internships for our students.
2. We developed a program and curriculum for academic internships.
3. We applied for and received a grant of $9,100 from the University Internship Office to support our new efforts.
4. We have begun contacting prospective employers about internships and have developed a long list of contacts and promising opportunities for students.
5. We are organizing an “internship night” for students and employers to meet in Fall 2010.

Careers in Math Seminar

The “Careers in Math” seminar features alumni and friends of the Mathematics Department who come to campus to speak about their (non-academic) careers that use mathematics. The speakers in Fall 2009 were Joy Lind (communications and operations research), Lauritz Petersen (cryptography), Alan Ashton (business and computers), Stephen Black (law), Carol Meyers (counterterrorism), and Norman Jarvis (Finance). Students expressed appreciation for the series and indicated that they had learned a great deal and were better aware of what their options and opportunities were for the future. The talks were open to the general campus community and were very popular—usually generating an audience of over 100.

Major Field Test

As part of our learning outcomes assessment, all of our graduating senior students are required to take a standardized national exam—either the Major Field Test (MFT) or the GRE in mathematics. The students who plan to go to graduate school take the GRE and the rest take the MFT. The MFT is a comprehensive nationwide exam covering most of the standard undergraduate level mathematical curriculum. In 2009 a total of 283 other institutions participated in the exam with an overall mean of 154.1 and a median of 154 (out of 200 possible). Both the mean and the median for BYU math students taking the exam were 188, putting almost all of our students and putting BYU as an institution in the 95th percentile (the highest reported).

Special Year in Topology

The academic year 2008-2009 was a special year in topology at BYU, during which funds were provided to bring leading researchers to BYU and to make BYU a focus for topology. The primary faculty involved in this special year were Jim Cannon, Greg Conner, Denise Halverson, Steve Humphries, Jessica Purcell, Eric Swenson, and David Wright. Throughout the year, these faculty were able to develop new collaborations as well as expand existing collaborations with colleagues in the United States and Europe, and to discuss new developments in the field of topology. Special year funds primarily went to support visitors and travel, and also to help BYU host a conference in May.

Visitors:

We brought several visitors in topology to BYU during 2008-2009. All visitors spoke at the topology seminar on topics of current research. Some also spoke at the department colloquium. These speakers gave our graduate students and faculty exposure to cutting edge research. Moreover, visitors spent time collaborating with faculty, many discussing ideas that have led to results that have been or will soon be published. This is true, for example, for Professors Cannon, Conner, Halverson, Purcell, Swenson, and Wright. Discussions with visitors for each of these faculty led to at least one paper. Some of the collaborations are new, others a continuation of ongoing projects. In all cases, the collaborative works would have taken significantly longer to produce if not for the special year. One visitor, Dušan Repovš, also collaborated on publications with BYU graduate student Mark Meilstrup.

Conference:

In May, we organized a three-day topology conference in Moab, Utah. In addition to receiving partial support for the conference from BYU special year funds, we also received an NSF conference grant. Over 50 participants attended, from the US and abroad, including 10 graduate students from BYU. There were
15 excellent research talks and three expository presentations aimed at graduate students. Speakers included outstanding established researchers as well as up-and-coming junior mathematicians. The quality of the talks was very high—a fact commented upon by many participants, and also evidenced by the high attendance rates at each talk. The audience was engaged and asking questions throughout. The conference also led to conversations in mathematics outside of the talks, and collaboration among participants. Indeed, many participants spent conference free time working on research with collaborators. In summary, the conference was highly successful. Several participants have asked that we organize another Moab topology conference. It helped to increase productivity of topologists at BYU and elsewhere, and to improve relations of topologists with BYU.

**External Funding** External funding in the department has increased in the past few years. In 2009 we had new and ongoing grants totaling $3,452,228, which we have been able to use to substantially strengthen our department and help our students. Much of this funding was granted to support undergraduate research mentoring and other educational projects, but there was also substantial external support for research. The most notable new funding this year was Jeff Humpherys’ NSF CAREER award. The total number of proposals submitted this year was 17. A total of 60% of our faculty either submitted a proposal for funding or had ongoing funding in 2009. This is up from 47% in 2008.

**Faculty Awards and Recognitions** We have many outstanding faculty in our department, and this year a few of them were recognized with awards from the college, the university, or from professional associations. These include:

1. Mathematical Assoc. of America National Franklin and Deborah Tepper Haimo Award for Distinguished College or University Teaching of Mathematics: Michael Dorff.
2. BYU Young Scholar Award: Jeff Humpherys.
3. National Science Foundation Faculty Early Career Development (CAREER) Award: Jeff Humpherys.
4. College Excellence in Teaching Award: Darrin Doud.
5. Mathematical Assoc. of America Project NExT Fellows: Pace Nielsen and Paul Jenkins.
6. Mathematical Assoc. of America Meritorious Service Award: Michael Dorff.

**Outreach** We have noticed that large numbers of students who do well at math in high school do not take additional mathematics at the university. This prevents them from majoring in any of the discipline in our college. Our outreach efforts are primarily directed at addressing this serious problem. We have been involved in significant outreach efforts for several years, including our Math Circle program for Junior High and High School students. We also initiated several new outreach efforts in 2009, including

1. Arranging public recognition for Junior High and High School students who do well on the AMS exams and offering AMC exams on campus for students whose schools do not offer them.
2. Developing print and media resources for school math teachers to answer the question—“When will I use this?”
3. Helping inform students of the importance of mathematics and the many rewarding career opportunities available to students who study mathematics.

**When Will I Use Math. Com** The most common question that students ask math teachers at every level is “When am I ever going to use this stuff?” High school and other teachers have often approached us for help answering this question. We decided that a very effective way to answer this question for the most people possible would be to make a website with lots of information about careers that use mathematics. Geared toward high school students and their math teachers, the site When Will I use Math.com highlights how math is used in over 40 math-related and non-math-related careers: doctor, lawyer, etc. The website’s “Did You Know?” section has articles on math in real life, new discoveries, tidbits, and unsolved problems. “How to Succeed in Math” addresses the myth that only born-math-geniuses can excel in the discipline. A teachers’ forum, downloadable AV content, competition information, challenging problems, and posters and t-shirts for order provide a wealth of additional resources for the classroom. A blog keeps tabs on math-related stories in the media. Since its August 2009 launch, When Will I Use Math.com has received over 37,000 unique visitors from 152 countries. Together, they tallied over 249,125 page views with average time on the site of 4.25 minutes—we interpret this to mean that people are reading a significant amount of the content on the site. The site has developed a community of around 300 members who contribute content and comments to the site.
Film Series: *We Use Math* In 2009 we began work on an ambitious project to help address the very common misconception that the only jobs available to those who study math are either school teacher or university professor. The film series will consist of several short (5-10 minute) high-quality films. Each one will feature one or two people working in a specific non-teaching career that uses math, detailing their lives, their jobs, the types of problems they get to work on, how they prepared for and then got the job, and other aspects of the career that students will need to know to answer the question—"What can I do if I study math?" The first film is an introduction to the series and is nearly complete. We have promising leads for additional funding for the rest of the series. Our goal is to have the series shown in every high school math class in America. A nearly-finished cut of the first film can be seen at math.byu.edu/~jarvis/WeUseMath.html

Additional materials We have produced a poster, postcards, and other materials for high school teachers and career counselors to share with their students to help answer students’ questions about mathematics, what it’s good for, and why BYU is a great option for good students who want to learn more. These have been distributed to many high schools in the intermountain region.

Challenges

Increasing Demands on a Small Faculty Nationwide, as well as at BYU, there is an increased demand for mathematics courses at many levels, and the hiring freeze may also present some challenges, but in addition to all that, several factors have increased our need at BYU lately.

1. The number of math majors is increasing, and we see a corresponding increase in demand for core courses like Math 290.
2. We are further expanding our efforts in undergraduate mentoring and are improving undergraduate teaching. Since 2005 we have seen a 260% increase in the number of students being mentored and a 400% increase in the number of Spring Research Conference participants. Unfortunately, undergraduate mentoring does not significantly help faculty with their scholarship— in mathematics it usually interferes with scholarly productivity—but we are committed to doing it because it is important for our students.
3. Teaching-only faculty with large teaching assignments have retired and were replaced by faculty who are research active. The new faculty are much better able to help with undergraduate mentored research, and they provide a deeper and more up-to-date learning experience for our students; but they are not teaching as much as those who retired. On the other hand, the overall size of the BYU Mathematics Department is extraordinarily small for the number of students we serve. Specifically, we have only 35 FTEs in our department to serve the roughly 28,000 undergraduate students of BYU, that is, about 800 undergraduate students per mathematics faculty member, whereas comparable schools normally have many fewer undergraduate students per mathematics faculty member—closer to 400 to 500 per faculty member, excluding math education faculty. That would be comparable to having between 56 and 70 FTEs in the BYU Math Department (in addition to any faculty that are in Math Education). We understand that other schools are not exactly comparable to BYU, but the unusually small number of mathematics faculty at BYU, combined with increasing demands on faculty resources, do present challenges to our ability to effectively serve the university, our client departments, and our students.

Many Sections of Math Courses Taught by Another Department Because of the Math/Math Education split nine years ago, roughly 30% of our undergraduate courses are taught by Mathematics Education Department faculty and graduate students. Having people from another department teaching a large percentage of our courses presents many ongoing challenges. Some of these challenges include:

1. Difficulties coordinating scheduling between the two departments and adjusting for changing numbers of sections being offered.
2. Difficulties adjusting teaching assignments to reflect faculty strengths and weaknesses.
3. Difficulties ensuring that instructors from outside our department are qualified to teach mathematics courses.
4. Difficulties ensuring that instructors from outside our department are willing to cover the expected learning outcomes for our courses.
5. Difficulties handling student complaints and other problems with instructors who are not accountable to us.

These problems have been a consistent challenge for many years. Fortunately, Steve Williams and Blake Peterson in Math Education have been generally cooperative, and we are mostly succeeding at handling these
challenges for now. But having 30% of our sections (including many upper-division courses) taught by faculty outside our department is bad for students and is not sustainable.

**Graduate Degrees**

**April 2009 Graduates**

<table>
<thead>
<tr>
<th>M.S.</th>
<th>Thesis/ Project Title</th>
<th>After Graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian Rushton</td>
<td>Alternating Links and Subdivision Rules</td>
<td>PhD at BYU</td>
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**August 2009 Graduates**

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<th>M.S.</th>
<th>Thesis/ Project Title</th>
<th>After Graduation</th>
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</thead>
<tbody>
<tr>
<td>Blake Barker</td>
<td>Evans Function Computation</td>
<td>PhD at Indiana U</td>
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<tr>
<td>Natalie Bergin</td>
<td>The Orbifold Landau-Ginzburg Conjecture for Unimodal and Bimodal Singularities</td>
<td>PhD at BYU</td>
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<tr>
<td>Luo</td>
<td>Numerical Schemes for Stochastic Differential Equations and Some Examples</td>
<td>PhD at BYU</td>
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<td>Kayla Owens</td>
<td>Properties of the Zero Forcing Number</td>
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<td>Nathan Perry</td>
<td>Fusion of the Parastrophic Matrix and Weak Cayley Table</td>
<td>PhD at BYU</td>
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<td>Kevin Powell</td>
<td>Topics in Analytic Number Theory</td>
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<tr>
<td>Nathan Priddis</td>
<td>Some Congruence Property of Pell’s Equation</td>
<td>PhD U. of Michigan</td>
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<tr>
<td>Jeremy West</td>
<td>The Expectation of Transition Events on Finite-State Markov Chains</td>
<td>PhD U. of Michigan</td>
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</table>

**December 2009 Graduates**

<table>
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<tr>
<th>M.S.</th>
<th>Thesis/ Project Title</th>
<th>After Graduation</th>
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</thead>
<tbody>
<tr>
<td>Yuren He</td>
<td>A brief introduction to the bandit problems</td>
<td></td>
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<tr>
<td>Steven Lutz</td>
<td>Hokua - a Wavelet Method in Audio Fingerprinting</td>
<td>PhD at</td>
</tr>
<tr>
<td>Jennifer Schofield</td>
<td>Growth and Geodesic of Thompson’s Group F</td>
<td>Ph.D at BYU</td>
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**PhD**

<table>
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<th>Dissertation Title</th>
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</thead>
<tbody>
<tr>
<td>Duokui Yan</td>
<td>Four Body Problem</td>
<td></td>
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</table>

**From the Annual Report of 2010–2011**

In 2010, we continued our ongoing effort to improve the quality of our undergraduate major programs and our undergraduate service courses. We had an external review of the department in December 2010, and the latest draft of that report states:

“The goal of the Mathematics department to become the #1 undergraduate program in the country is highly ambitious. The department has been pursuing this goal so aggressively, however, that...it is arguably within reach.”

**Mentoring**

As part of our goal to improve our undergraduate programs, we have made undergraduate research mentoring a major point of emphasis in the department. In 2010 the highlights of our activities in mentoring included:

1. CURM: Our NSF-sponsored Center for Undergraduate Research in Mathematics has continued to receive national attention for its success in sharing the BYU Math Mentoring Model.
2. IMPACT: Our IMPACT program began its fifth year. It was supported by a large, four year, NSF CSUMS grant to support undergraduate mentor ed research in mathematics and statistics. The grant was extended by the NSF for one additional year to cover summer 2011, and we have just received word that an anonymous donor will fund the program until 2012.
3. REU: Our Summer Research Experience for Undergraduates completed its fifth year.
4. Although we were already the largest undergraduate mathematics mentoring program in the country, participation by BYU math students and faculty in mentored research continued to increase (from 7,377 hours in 2009 to 8,304 hours in 2010).

These highlights are described in more detail below.
CURM Our National Center for Undergraduate Research in Mathematics (CURM) finished its third full year of operation in 2010. CURM was established by a $1.26 million grant from the National Science Foundation, recognizing the success that both BYU and the BYU Department of Mathematics have had in mentoring undergraduates in research. The objectives of CURM are to promote undergraduate research in mathematics throughout the United States by

1. training professors as mentors for undergraduate research projects,
2. providing funds to professors to establish undergraduate student research groups at their own institutions during the academic year,
3. advising professors on how to organize and continue to operate undergraduate research groups at their own institutions, and
4. preparing undergraduate students to succeed in graduate studies in mathematics.

More information is available at the CURM website: curm.byu.edu.

CURM helps undergraduate students at universities and colleges throughout the U.S. begin and succeed at doing undergraduate research. It also focuses on under-represented groups in mathematics. During the past two years, 54% of CURM students were female and 31% were from under-represented minority groups. Results from the past two years (2007-2009), which consisted of 29 professors from universities across the U.S. working with 91 undergraduates at their universities, include:

- 37 research papers authored or co-authored by undergraduates
- 81 oral research presentations given by undergraduates
- 21 poster presentations given by undergraduates

In addition to this program, we held the 2010 CURM Spring Conference on March 19-20, 2010 at BYU. The conference included presentations of research done by 55 students from colleges and universities across the country, and attendance of about 100 people. In addition, there were invited addresses by Frank Morgan (Williams College) on Soap Bubbles, Aparna Higgins (University of Dayton) on Demonic Graphs and Undergraduate Research, and Michael Dorff (BYU) on careers in mathematics.

IMPACT Program and CSUMS Grant In 2011, the NSF-funded Interdisciplinary Mentoring Program in Analysis, Computation, and Theory (IMPACT) commenced its fifth year. This year-long program centers on interdisciplinary research in mathematics, statistics, and numerical computation. The thematic research areas for the 2010-2011 academic year are Actuarial, Investment, & Management Sciences (AIMS), Functional Data Analysis, Mathematical Systems & Optimization, Nonlinear Waves and Coherent Structures, Computational Biology & Bioinformatics, and Geoscientific Applications. In 2011, IMPACT sent students and faculty members to conferences in Dallas (American Physical Society March Meeting), Baltimore (American Controls Conference), and Alicante, Spain (Ninth Valencia International Meeting on Bayesian Statistics) to present their research. At the time of this writing, the IMPACT Program consists of 35 students (22 undergrads and 13 grads) and 11 faculty representing five departments in the College of Physical and Mathematical Sciences. For more information see impact.byu.edu. On March 14, 2011, it was confirmed that the program would receive funding from an anonymous donor to continue for a sixth-year (until the summer of 2012).

NSF Sponsored Research Experience for Undergraduates (REU) Also related to our efforts in mentoring is our NSF sponsored Research Experience for Undergraduates (REU) in Mathematics directed by Michael Dorff. Typically, the BYU REU involves 12 undergraduate students, 60% female and 75% from PUIs. All undergraduate participants write a research paper and present their results at a national meeting. For the 2010 REU program, there were 181 applications by undergraduates from over 130 different universities and colleges throughout the U.S. The following 16 participants were chosen: Blake Allen, Utah Valley Univ.; Valmir Bucaj, Texas Lutheran Univ.; Sarah Cannon, Tufts Univ.; Amanda Curtis, Wellesley College; Amy Hancock, Washington State Univ.; Cathryn Holm, St. Olaf College; Katelynn Kochalski, Canisius College; Kaylee Kooiman, Calvin College; Jamal Lawson, Loyola University New Orleans; Payton Lindsay, Southern Illinois University Carbondale; Joan Madsen, BYU; Rachel Messick, BYU; Eric New, The College of New Jersey; Dane Skabelund, BYU; Amber Verser, Wartburg College; and Ryan Viertel, BYU.

Of the undergraduate students in the BYU REU, most stated that before the REU they were unsure about attending graduate school in mathematics, but after completing the BYU REU, 86% have actually gone on to graduate school in mathematics (89% of the women and 100% from PUIs).
BYU Students Involved in Mentored Mathematics Research We have many faculty members doing one-on-one research with students, and several larger groups of student researchers, including the S-ring Group, the Minimum Rank Group, the IMPACT Program, the Computational Number Theory Group, the Geometric Optimization Group and the Quantum Singularities Group.

Activities and Support for Undergraduates
In addition to mentored research, we have put a great deal of effort into developing additional ways to ensure that our undergraduate students receive an excellent education. In 2010, some of these efforts included

1. Undergraduate colloquium (now called Focus talks)
2. Organizing the Intermountain Mathematics Competition and supporting the Putnam team
3. Careful tracking and advising of majors
4. New career and internship support for math majors

One measure of the success of these efforts is our students’ scores on the National Major Field Test (MFT) in mathematics.

Undergraduate Colloquium In 2010, our speakers were Bob Molzon (Mathematical Models in Economics), Neils Nygaard (Mathematics and Trading), Ram Murty (Ramanujan and the Zeta Function), Frank Morgan (From Soap Bubbles to the Poincaré Conjecture), Bob Devaney (The Fractal Geometry of Mandelbrot Set), Tom Garity (Mathematics is Truth: Or is it?), Neal Koblitz (The Different Faces of Mathematics in Cryptography), and John Friedlander (A Brief History of Primes). Students seem to like the talks and attendance is usually high (we often fill 1170 TMCB which has a capacity of about 200). Because of their national reputation as speakers, and because our series has developed a reputation for being interesting and understandable, these speakers attract many people from other colleges and universities.

The Putnam Exam and the Intermountain Math Contest Our ongoing efforts in recruiting and coaching students resulted in the BYU Putnam Team’s placing 16th out of about 550 institutions in the US and Canada. We had many students participate in the exam and many of them scored very well.

We also expanded our annual Intermountain Mathematics Contest from just being a BYU vs. Utah competition to include the University of Nevada and Boise State. The team scores were BYU 178, Nevada 93, Utah 80, and Boise State 15. The three highest scorers were all from BYU: Hiram Golze, Michael Griffin, and Robert Yang. More important than our team’s excellent score in the competition is the fact that 43 total BYU students participated in the competition. This is much more than in any previous year. Although not all students do well on these exams, they encourage and help students to develop problem-solving skills. They also help build BYU’s reputation as an excellent school for studying undergraduate-level mathematics. And finally, they build enthusiasm and interest in mathematics across campus and the region.

Tracking and Advising Majors All students are invited to meet with faculty each semester to get help in planning their programs of study and exploring their career options; not all of the students accept our invitations, but in 2010, 90% of our Seniors and 71% of our Juniors met with faculty advisors. According to students, this ongoing advisement effort has helped them graduate faster: “He helped me plan a schedule to get me to graduate on time even though I’m a couple classes behind.” It has also helped them prepare better for their long-term career goals: “It was most helpful to have help determining what is needed to make me a good candidate for graduate school.” We believe that this advisement also improved retention of our majors. As one student said of the advisement experience this year: “It is really helpful to talk to a person who has authority and experience in making decisions about curriculum and degree requirements. The advisement website cannot give advice specific to a person and their goals, but a professor can.”

Career and Internship support for Students It has become very clear in the past few years that many students are unaware of the outstanding career and internship opportunities available to math majors. We have taken several important steps to help our current majors be more aware of these many opportunities. These include

1. Substantially increasing our staff support for finding and advertising internships, REUs, fellowships and scholarships, and job opportunities for math majors, and
2. Offering a “Careers in Mathematics” seminar each Fall.

New support for Internships and Other Opportunities In the past, a small number of students in the department have participated in internships; these internships were not organized by the department and earned the students no academic credit. This is typical of mathematics departments around the country. Indeed, we
know of no mathematics departments that have any support for student internships. In 2009 and 2010, we took steps to substantially change this at BYU. We applied for and received a total of $9,100 from the Internship office to support our internship program. With this funding we were able to fly in several prospective employers. We hosted an internship presentation when they arrived for all students interested and arranged meetings between the guest and students that provided the students a more informal chance to talk with the guests about internships and working at their company. Some of those companies include the National Security Agency, the Department of Defense, Raytheon, Epic Systems, and General Dynamics. We had roughly 130 students attend the presentations on the weeks we had them. Most of the guest speakers were BYU alumni that were able to come back and give service to the current students by sacrificing their time and presenting to our students. This also makes the students more inclined to give back to the university in a similar manner after graduation because they could see the impact it had on their education.

In addition to the Internship Seminars, we had a BYU Math Alumni Mentor Night where five local Math Alumni came and shared information about their current jobs and how they got there. Students were able to meet and talk with alumni and ask questions pertaining to their future career goals. Our Internship Coordinator contacted all past math graduates and asked if they would be willing to mentor current math majors. We had an overwhelmingly positive response with 107 alumni providing e-mail and phone contact information, as well as their current employer, for us to distribute to students. This is very beneficial as students begin making decisions on the career path they would like to pursue. Math majors can contact a mentor that is currently working in their field of interest. With the grant money we were also able to provide students with substantial information to help them in their search for internships, including a list of 72 internship opportunities, information about e-recruiting, and information about alumni mentors. We are starting to see an increase in students pursuing and participating in Internships. Until 2010, we have no record of any students ever completing an internship in math. However, 7 students either completed an internship in Summer 2010 or were accepted to an internship for Summer 2011. Some of the companies are Novatek Inc., the National Security Agency, the Department of Defense and Goldman Sachs. Students who participated in internships this year called them “an invaluable experience.” We hope to see the number of internships grow rapidly, as students report to their peers about the experience and they recognize the long-term career benefits of an internship. Since many math students are unfamiliar with the concept of internships, we send out a weekly reminder in the department Newsletter for Math Majors and Minors highlighting Internship Opportunities that we find on e-Recruiting, in case they are not yet actively looking on their own or using the program.

Careers in Math Seminar The “Careers in Math” seminar features alumni and friends of the Mathematics Department who come to campus to speak about their (non-academic) careers that use mathematics. The speakers in Fall 2010 were Benjamin Pratt-Ferguson from Raytheon, John Sadowsky from General Dynamics, Jared Collings from Regence, Lauritz Petersen from the NSA, Eric Murphy from the Department of Defense, and Jonathan Balinski from Epic Systems. Students expressed appreciation for the series and indicated that they had learned a great deal and were better aware of what their options and opportunities were for the future. The talks were open to the general campus community and were very popular—usually generating an audience of around 130.

Measures of Success We have two main indicators of the positive effects our efforts for math majors are having. The first is students’ scores on the Major Field Test and the second is the increase in the number of math majors.

Major Field Test As part of our learning outcomes assessment, all of our graduating senior students are required to take a standardized national exam—either the Major Field Test (MFT) or the GRE in mathematics. The students who plan to go to graduate school take the GRE and the rest take the MFT. The MFT is a comprehensive nationwide exam covering most of the standard undergraduate level mathematical curriculum. In 2010, a total of 300 other institutions participated in the exam with an overall mean of 153.9 and a median of 154 for all students at all institutions (out of 200 possible). The mean (182) and the median (184) for BYU math students taking the exam put BYU, as an institution, in the 96th percentile (the highest reported). Students who take the GRE instead are generally much better prepared than those who take the MFT, so the very positive MFT results provide significant evidence that our students are mastering a core of nationally accepted learning objectives.

Increasing Major and Minor Enrollments The number of (primary) math majors has been increasing fairly steadily from 164 in 2004 to 260 in 2010. This seems to indicate that our efforts to improve our major are leading to improved retention and recruiting. We expect to see numbers of both majors and minors continue to
increase as students begin to recognize the many benefits that a math degree offers, and as our program continues to improve.

**Scholarship** Overall, scholarship is improving in the department. Many faculty are engaged in seminars and collaborations, many are submitting grant proposals, our productivity index is nearly the highest it has ever been, the total number of pages published per faculty member was higher than ever, and our college venue count ($V$ in the Sederberg equation) is up to 62 this year, up from 58 last year and 49 in 2008.

**Scholarly productivity, scholarly activity, and pages per faculty member** Faculty scholarly productivity (papers per faculty member) was 1.5, which is essentially the same as it was last year (1.6) and is up from 1.1 in 2008. This is also very good in comparison to national averages for mathematicians. Faculty scholarly activity was down somewhat, at 68%, from 73% last year. The number of peer-reviewed pages published per faculty member was 32 in 2010, up from 29 in 2009, and far above 18 in 2008, and more than three and a half times what it was in 2003 (9).

**External Funding** External funding in the department has increased in the past few years. In 2010, we had ongoing grants totaling $1,742,104 and new grants totaling $312,249, this is down from $939,000 of new funding in 2009. This apparent decrease is somewhat concerning, although, like faculty publications, there is naturally some variation from year to year, and faculty who received funding in 2009 generally did not need to apply for funding in 2010. Much of this funding was granted to support undergraduate research mentoring and other educational projects, but there was also substantial external support for research.

The total number of proposals submitted this year was 10. A total of 47% of faculty with a research expectation either submitted a proposal for funding or had ongoing funding in 2010. This is equal to what it was in 2008, but down from its value in 2009 (60%).

**Faculty Awards and Recognitions** We have many outstanding faculty in our department, and this year a few of them were recognized with awards from the college, the university, or from professional associations. These include

2. College of Physical and Mathematical Sciences, Young Scholar Award: Jeff Humphreys.
3. Mathematical Assoc. of America, Franklin and Deborah Tepper Haimo Award for Distinguished College or University Teaching of Mathematics: Michael Dorff.
4. Mathematical Assoc. of America Meritorious Service Award: Michael Dorff.
6. 2 NSF CAREER awards (the most prestigious award given by the NSF to young scholars)
7. 2 Karl G. Maeser Distinguished Faculty Lecturers
8. 2 Sloan Fellows

Similarly, our current faculty have received at least 21 external awards for teaching, including

9. 1 Haimo award winner (the most prestigious award in the US for college mathematics teaching)
10. 4 MAA awards for Distinguished College or University Teaching of Mathematics
11. 3 Karl G. Maeser Excellence in Teaching Awards

**Website: WeUseMath.org** In Fall 2009, we launched a website WhenWillIUseMath.com to answer the site’s eponymous question. The site was renamed WeUseMath.org in December 2010 and it was expanded to also provide guidance to students who like mathematics but mistakenly believe that the only careers they could pursue with a math degree are teaching oriented. Over 241 schools (elementary to university), businesses, and personal websites have put WeUseMath.org as a link on their sites, and the site receives an average of 3,100 hits per week. The site WhenWillIUseMath.com has a total of over 1,200 referring web links from other sites that now are all redirected to WeUseMath.org. The site has partial sponsorship from the Mathematical Association of America, and we are currently negotiating for partial sponsorship from the Association for Mathematics Teacher Educators as well.

**Challenges**

**Inadequate number of permanent, full-time staff** Since the hiring freeze, we have had only one permanent, full-time office staff member, Lonette Stoddard, and two part time staff (Sarah Warcup, Cat-II, business
We feel that the best way to meet the students’ needs is to provide a new program in Applied and Computational Mathematics, which will provide students with a strong foundation in the mathematical underpinnings necessary to address these challenges. The emphasis will be on mathematics, statistics, and career development.

We are preparing a proposal for this new program to submit to the college and university curriculum committees, but one difficult challenge we face is a shortage of necessary resources. The current undergraduate program is one of the best in the country at preparing students for a PhD and academic careers, and it is a key part of the pipeline that will provide our best LDS faculty in the future, so it cannot be cannibalized in order to support the new program, but the new program is important to support the needs of the students planning a non-academic career, and it will require additional faculty time and expertise. Our challenge is how to meet the needs of students in both the two different tracks preparing for academic or industrial careers.

Recruiting Good Graduate Students from Outside BYU Graduate students play an essential role in our work to serve the undergraduates both in our major and across campus. They work as TAs in our service courses and they provide both role models and support for our majors. We struggle with the fact that our best graduate students have almost always come from our own undergraduate program. The BYU students are excellent, but it would improve the program to have students from diverse backgrounds. Having more students from outside BYU would also help us extend BYU’s influence and give more LDS students an opportunity to have the BYU experience. The problem is that students recruited from other schools, especially area schools and BYU-I and BYU-H, are generally ill prepared and struggle much more in our graduate programs than students who came from BYU. This is not a criticism of those schools so much as the simple result of our having truly outstanding undergraduate students at BYU. We have tried a number of recruiting ideas and have hired an outside consulting firm to advise us on how to improve the pool of non-BYU applicants, but none of these have been especially successful. It would help if we had contact with, and support from, the institute directors across the country, but we have not been able to get this help yet. We are also currently exploring possibilities for bridging the gap between our master’s program and other schools’ bachelor’s programs by providing a summer “boot

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**Preparing Students for Careers in Industry** We have a strong track record of preparing students for graduate work and careers in academic research, but it is becoming increasingly clear that we need to do a better job of preparing students for non-educational careers. Our efforts to help students get internships provide a first step in this direction, but it is becoming increasingly necessary to provide the students with new skills and knowledge. We are seeing the following themes emerge as needs for students who want to be successful mathematicians in the non-academic workforce:

1. A need for better modeling and simulation methods.
2. Increased capability for interdisciplinary design.
3. Better tools and understanding for analyzing uncertainty and risk.
4. Greater capabilities for dealing with large data sets.
5. Abilities to cope with complex systems.
6. Improved capabilities for predicting and understanding market behavior.

We feel that the best way to meet the students’ needs is to provide a new program in Applied and Computational Mathematics, which will provide students with a strong foundation in the mathematical underpinnings necessary to address these challenges. The emphasis will be on mathematics, statistics, and career development, and a chosen area of concentration in the pure and applied sciences that provides a fertile domain for applying these concepts. We believe this program will also attract new talent to the sciences, and to provide them with the training and the employment opportunities that will enable them, and others like them, to drive this country’s economy forward during the coming decades.

We are preparing a proposal for this new program to submit to the college and university curriculum committees, but one difficult challenge we face is a shortage of necessary resources. The current undergraduate program is one of the best in the country at preparing students for a PhD and academic careers, and it is a key part of the pipeline that will provide our best LDS faculty in the future, so it cannot be cannibalized in order to support the new program, but the new program is important to support the needs of the students planning a non-academic career, and it will require additional faculty time and expertise. Our challenge is how to meet the needs of students in both the two different tracks preparing for academic or industrial careers.

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“camp” covering missing material for bright and motivated incoming graduate students who were just inadequately prepared by their undergraduate institutions.

**Graduate Degrees**

**APRIL 2010 GRADUATES**

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<tr>
<th>M.S.</th>
<th>Thesis/Project Title</th>
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<tr>
<td>Corson, Samuel</td>
<td>Applications of Descriptive Set Theory in Homotopy Theory</td>
<td>Ph.D BYU Math</td>
</tr>
<tr>
<td>Ricks, Russell</td>
<td>Planar CAT(k) Subspaces</td>
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<tr>
<td>Chen, Sijin</td>
<td>Asian Spread Option Pricing Models and Computation</td>
<td>NV Energy</td>
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**AUGUST 2010 GRADUATES**

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<td>Kempton, Mark</td>
<td>The Minimum Rank, Inverse Inertia, and Inverse Eigenvalues Problems for Graphs</td>
<td>PhD UCSD</td>
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<td>Taylor, James B.</td>
<td>Optimal Superreplication with Shortfall Risk in Levy Driven Markets</td>
<td>Ph.D BYU Math</td>
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<tr>
<td>Hansen, Brian</td>
<td>Explicit Computations Supporting a Generalization of Serre’s Conjecture</td>
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<td>Lambert, LeeR</td>
<td>A Toolkit for the Construction and Understanding of 3- Manifolds</td>
<td>Adjunct Faculty, BYU</td>
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<tr>
<td>Meilstrup, Mark H</td>
<td>Wild Low Dimensional Topology and Dynamics</td>
<td>Postdoc, Univ. of Leoben, Austria</td>
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The Math Lab seats 300 students and serves thousands throughout each semester, including Spring and Summer terms. The Lab is open to all BYU students, the most numerous participants being math, science, engineering, and business majors. Students can come to the Lab with specific questions for tutors or to work on their homework in a group setting. Textbooks, student solutions manuals, and calculators are available for checkout in the Math Lab. Students enrolled in Independent Study courses are also offered services, including free tutoring via telephone and email.

Currently, all Math Lab tutors are trained and qualified to tutor mathematical concepts from algebra through calculus, including the following:

- Math 97 (Intermediate Algebra)
- Math 102 (Conceptual Mathematics)
- Math 110 (College Algebra)
- Math 111 (Trigonometry)
- Math 112 and 113 (Calculus 1 and 2)
- Math 116 (Essentials of Calculus)
- Math 118 (Finite Mathematics)
- Math 119 (Introduction to Calculus)

Some tutors are qualified and trained to tutor upper division math classes, including the following:

- Math 290 (Fundamentals of Mathematics)
- Math 302 and 303 (Mathematics for Engineering 1 and 2)
- Math 313 (Elementary Linear Algebra)
- Math 314 (Calculus of Several Variables)
- Math 334 (Ordinary Differential Equations)

The Math Lab employees currently provide the following services for BYU students:

- Free tutoring on a semi-individual basis available Monday through Saturday.
- Free tutoring via telephone and email for Independent Study students.
- Specialized review sessions prior to most math tests throughout the semester.
- Textbook and calculator checkout for use inside the Math Lab, including access to student solutions manuals for some classes.
- Access to math formula handouts for general use (these can be found online).
- Reviews of past exams in a controlled environment.
- A list of private tutors available for hire to enable networking among students.

The Math Lab employees currently provide the following services for BYU math faculty:

- Proctoring of exams.
- Collection and organization of homework assignments.
- Organization and distribution of graded assignments and exams.
- A site for office hours that fosters student-teacher interaction.

The Math Lab also offers excellent opportunities for its student employees, including the following:

- Teaching experience in a busy environment.
- Weekly training and review sessions to refresh concepts.
- Opportunities for leadership development.
- Work schedule tailored to school schedules.
- Access to a library of math textbooks and solutions manuals.

Student Positions and Job Descriptions
Math Lab Secretary

- Answer general student inquiries in person and via telephone.
- File and maintain an organized, professional workspace.
- Create and maintain files for ungraded homework, graded homework, and graded exams for professor and/or student pick-up.
- Check in and out textbooks and calculators to students.
- Keep track of Math Lab inventory, and order new materials via the Math Department when necessary.
- Keep track of employee attendance and make note of any changes (i.e. absence, substitute, etc.) in the weekly schedule. Maintain a file of attendance forms for each pay period.
- Enter and compile data regarding Math Lab services, and send this information each month to specified Math Department employees if applicable.
  - Head count (lab area and fishbowl)
• Data gathered from sign-up sheets
• Independent Study data
• Tutors working per hour
• Secretary projects and daily duties
• Inventory
• Graduate student attendance
• Proctor exams.
• Inform students of review sessions and other Math Lab events.
• Prepare Y-Time information every other Friday so employees can sign for their hours.
• Organize and execute test corrections:
  o Pick up exams from the testing center.
  o Create and maintain these exams in files.
  o Oversee and explain the test corrections process.

Math Lab Head Secretary
• Create secretary working schedules each semester as well as during finals week.
• Plan and conduct weekly secretary meetings.
• Oversee secretary performance and take care of questions and concerns from secretaries.
• Assist the Math Lab Administrator in the hiring process of secretaries.
• Use Qualtrics to evaluate employees, analyze Math Lab data, and create surveys.
• Complete projects assigned by the Math Lab Administrator to enhance the services of the Math Lab.

Math Lab Tutor (Upper and Lower Division)
• Answer questions and explain concepts to students in the Math Lab.
• Attend weekly training meetings to maintain teaching and concept-based skills.
• Assist students with mathematical and computer-related questions in the Math Access Point computer labs.
• Teach Math Lab-hosted review sessions for selected classes throughout the semester.

Math Lab Head Tutor (Upper and Lower Division)
• Take initiative to improve the services of the Math Lab.
• Create a working schedule each semester for the tutors under their jurisdiction.
• Organize tutor training meetings and review assigned subjects.
• Be available to assist and train tutors in math and teaching skills.
• Maintain a working relationship with Math and Math Education faculty and staff to provide accurate and helpful information on current classes to students and tutors.
• Communicate with students, staff, and faculty to ensure that the Math Lab is meeting the needs of students.
• Obtain syllabi for the current semester from all sections of classes under their jurisdiction.
  o Lower Division: 110, 112, 113, 116, 118, and other classes if necessary
  o Upper Division: 313, 314, 334, and other classes if necessary
• Inform professors of each semester’s schedule of review sessions.
• Schedule rooms for review sessions through Campus Scheduling.
• Assign tutors to teach reviews, or be willing to teach reviews if necessary.
• Advertise reviews in the Math Lab and in respective classes. Inform the secretaries of this information so they can make note and field questions.
• Use Qualtrics to evaluate employees, analyze Math Lab data, and create surveys.
• Correct tutor application exams.

Math Lab Administrative Assistant
• Help Math Lab Administrator with the following:
  o Create and maintain the employee schedule each semester.
  o Create and maintain the Math Lab budget each semester.
  o Correct tutor application exams.
  o Assist the Math Lab Administrator in the hiring process.
  o Plan and conduct weekly employee meetings.
  o Deal with questions or concerns from tutors and secretaries regarding Math Lab operations
  o Complete performance evaluations on all tutors every semester
  o Complete projects to enhance the services of the Math Lab
  o Assist the Math Lab Administrator in any and all necessary projects and tasks
Appendix 10. Entertaining Anecdotes

George Polya, a prominent mathematics professor at Stanford and an expert on problem solving, once wrote,

The traditional mathematics professor of the popular legend is absentminded. He usually appears in public with a lost umbrella in each hand. He prefers to face the blackboard and to turn his back on the class. He writes $a$, he says $b$, he means $c$; but it should be $d$. Some of his sayings are handed down from generation to generation.

“In order to solve this differential equation, you look at it till a solution occurs to you.”
“Geometry is the art of correct reasoning on incorrect figures.”
“What is the difference between a method and a device? A method is a device which you use twice.”

[Polya]

The BYU Mathematics Department and its faculty have a few anecdotes highlighting their tendency toward absent-mindedness and other foibles, as well as contributions to the general atmosphere of good humor that often prevailed.

During the 1980s, Lynn Garner gave a presentation on the absent-minded antics of some famous mathematicians (Newton, Hilbert, and Wiener) to the Square Root Club, a social organization of the wives and women faculty of the Math and Physics departments. Thaylene Barrett, president of the club, reported that the presentation kicked off a string of confessions at their table of similar events concerning current members of the department. The discussion continued into the parking lot; just before they dispersed, Ken Larsen hurried past in his shirt-sleeves, back toward the Wilkinson Center, saying, “I knew I brought a coat.”

Hal Moore’s wife Deon told about the time they were out driving when they came to a stop sign. Hal stopped the car, but didn’t start up again. There was no traffic coming. Deon finally asked him what he was waiting for, and he sheepishly admitted that he was waiting for a light to change.

Robert Burton told about a time his wife called him at his office to tell him that it was time to go to the hospital; their next child was about to be born. He said he would meet her at the hospital and leave his office. He decided to stop at the bookstore to pick up a book to read while he was waiting for the baby to come. He got so distracted in choosing a book that when he finally arrived at the hospital, the baby had already come.

G. S. Gill tells about a time when he had classes both on the upper campus and on lower campus; this would have been in the early 1960s. At the time, the Gills lived just below upper campus, in the vicinity of 500 East and 700 North. One Monday, Gill drove his car to campus, taught his morning class, and in the afternoon drove to lower campus to teach his class there. Then he walked the few blocks home, forgetting his car. Tuesday morning when it was time to go to upper campus again, he couldn’t find his car, so walked to his office. After class, he walked home again. That evening, there was an event in his ward, and a ward member remarked that he didn’t know Gill taught a class on lower campus on Tuesdays. Gill said he actually didn’t, and the ward member said he wondered because he had seen Gill’s car there. Gill said, “Oh, that’s where it is!”

Before the Talmage building was remodeled, there was a wide sidewalk through the breezeway that was often used as an access point by campus service vehicles. There was a bike rack next to the west side of the building just off the sidewalk. Lynn Garner was in the habit of riding his bicycle everywhere and always parked in that bike rack when he came to campus. One Saturday, he was running an errand to town when he decided to stop at his office to pick something up. He drove into the nearly empty parking lot and up onto the sidewalk, headed for the bike rack, when he suddenly realized that he was driving his car, not his bike.

In the days before telephone or computer registration, faculty members did not usually know which classes they would be teaching until the first day of the semester, because it was not known until then which classes had carried. One semester, Ken Larsen arrived on campus about 9 am on the first day, only to learn that his first class had been at 8 am. His next class was at 10, so he went to his office to prepare. The next time he looked at the clock, it was past 11, so he missed his second class, too. His last class was at 1 pm, so he watched the clock carefully as he prepared for this graduate class, in which not many students were expected to register. He got to the classroom on time and no students were there yet. He waited for about 20 minutes, but no one came. He finally walked back to the math office, only to find out that he had gone to the wrong room. By the time he got to the right classroom, no one was there and the hour was almost over. His first day was a total washout.
Roger Baker, a number theorist, tells of a 1992 conversation with Jim Cannon, who had devoted his entire career to topology. Jim said, “When I go to heaven, I will spend the first million years studying number theory.” Roger passed this remark on to a number theory colleague, who immediately responded, “When I go to hell, I will spend the first million years studying topology.” When Roger reported this, Jim thought it was hilarious.

Lou Chatterley tells the following story: I was Dr. Robinson’s assistant when he was the department chairman. I was sitting in my office when he came by. With a very stern look on his face and in his voice, he said, “Lou, you are no longer my assistant.” I was flabbergasted and I’m sure my face showed it. Then he started to laugh and said, “They have deleted the assistant name; you are now my associate department chair.”

Lou Chatterley continues: One of my responsibilities as the associate chair was to schedule the classes to be taught and those who would teach the classes. I had assigned John Higgins to an 8:00 class that was in his field of expertise. He came into my office and in a very stern voice said that he could not be assigned to that class. I said, “But it is one that you requested to teach.” His reply was very blunt: “Yes, but not at 8:00. I don’t teach until 10:00. You’ll have to change it.” “I can’t do that at this late date,” I said. “Well,” said he, “after 2 weeks of nobody showing up to teach it, the students will be storming your office.” I decided to change it.

Jan Wynn Tells this experience: During January of the mid 1980’s, while I was the faculty advisor for the BYU chapter of Pi Mu Epsilon, I walked to the catering facility to pick up some refreshments. They had put this light-green colored drink of about two gallons into a plastic five-gallon container. Just as I was leaving, the catering employee placed some chunks of dry ice into the container and left the spigot valve on the lid open at the top. I placed the drink on my left shoulder and held a box of cookies in my right hand. The morning was very cold—about five degrees above zero. The walk back to the Talmage building took about five minutes. While passing by the library, I noticed a line of 30-40 students waiting at a side door. Of course, they were all watching me with the jug on my shoulder. The escaping gas from the jug was making a hissing noise. Evidently, the spigot plugged up and the container was beginning to swell because of the increased pressure inside. Just as I was in front of the students, the container exploded and the green drink covered my head and left side. The students roared with laughter and I was very embarrassed. I immediately returned to the catering facility with green drink frozen on my head. My left eye was frozen shut. What a sight I was! The catering people issued me another jug of drink but left the lid off. I finally arrived back at my office. After getting cleaned up, the rest of the day passed by with no more unexpected problems, but my left ear had a ringing noise inside for a few hours.

Jan Wynn relates another event: During a fall semester, I was teaching a 4 pm large section of calculus in the Widtsoe building. About ten minutes into the lecture, a sheriff’s deputy entered the room and said that he had a warrant to arrest Dr. Wynn for giving unannounced pop quizzes. He handcuffed me and escorted me out of the room. Of course, the students roared with laughter. One of the students, who had arranged the prank, accompanied the deputy and me to the basement of the county courthouse, where there was a make-shift jail. Inside the jail were some desks and telephones. To make bail I had to call a friend and ask for a pledge to a certain BYU fund-raiser. I called a brother Christensen who was one of my counselors. He was amused at the story and made a pledge. By now my class was over but the students asked for an explanation the next day. Occasional humor in the classroom is good, although at times it can be embarrassing.

In the December 1963 issue of the *Math Monthly*, there appeared an article entitled, “An Analyst’s Bookshelf”, in which were presented twenty made-up book titles playing on mathematical terms. Some of the more memorable titles were

- A Short Table of Even Primes (Abridged)
- The Decline and Fall of \(e^x\)
- Life Begins at \(e^x\)
- 100 Tasty Fillings for Empty Sets
- 1001 Best Loved Double Integrals
- A Child’s Garden of Tchebycheff Polynomials

During the later 1960s, Paul Yearout and Lynn Garner came up with “An Algebraist’s Bookshelf” (not published) including the following titles:

- Associative Laws for Commuters
- Political Theory of Group Representations
In 1991, Wayne Barrett wrote new words to the popular tune, “It Had to Be You”, and renamed it, “It Had to Be e”. Lonette Stoddard reported that it was even performed on the radio. The lyrics of both songs follow.

<table>
<thead>
<tr>
<th>It Had to be e</th>
<th>It Had to be You</th>
</tr>
</thead>
<tbody>
<tr>
<td>It had to be e</td>
<td>It had to be you</td>
</tr>
<tr>
<td>Nonintegral e</td>
<td>It has to be you</td>
</tr>
<tr>
<td>I looked around</td>
<td>I wandered around</td>
</tr>
<tr>
<td>Until I found</td>
<td>And finally found</td>
</tr>
<tr>
<td>A base which would do</td>
<td>Somebody who</td>
</tr>
<tr>
<td>To differentiate</td>
<td>Could make me be true</td>
</tr>
<tr>
<td>Or to integrate</td>
<td>Could make me be blue</td>
</tr>
<tr>
<td>One which would not</td>
<td>And even be glad</td>
</tr>
<tr>
<td>Carry along</td>
<td>Just to be sad</td>
</tr>
<tr>
<td>Some ugly weight</td>
<td>Thinking of you</td>
</tr>
<tr>
<td>Some bases I know</td>
<td>Some others I’ve seen</td>
</tr>
<tr>
<td>Are simpler to state</td>
<td>Might never be mean</td>
</tr>
<tr>
<td>A snap to invert</td>
<td>Might never be cross</td>
</tr>
<tr>
<td>Exponentiate</td>
<td>Or try to be boss</td>
</tr>
<tr>
<td>But they wouldn’t do</td>
<td>But they wouldn’t do</td>
</tr>
<tr>
<td>For no other base can fit</td>
<td>For nobody else gave me</td>
</tr>
<tr>
<td>math so well</td>
<td>a thrill</td>
</tr>
<tr>
<td>With all its digits I love</td>
<td>With all your faults, I love</td>
</tr>
<tr>
<td>it still</td>
<td>you still</td>
</tr>
<tr>
<td>It had to be e</td>
<td>It had to be you</td>
</tr>
<tr>
<td>Irrational e</td>
<td>Wonderful you</td>
</tr>
<tr>
<td>It had to be e</td>
<td>It had to be you</td>
</tr>
</tbody>
</table>

A collection of “colorful riddles” made the rounds over the years. The first two of the following were popular in the mid-1960s, and most of the rest were due to Paul Yearout.

1. What is purple and commutes?
2. What is yellow and satisfies the Axiom of Choice?
3. What is grey and has integral solutions?
4. What is yellow and has a runner underneath?
5. What is blue and white and will always hold one more?
6. What is white, one-sided, and swims in the ocean?

Answers:

1. An abelian grape.
2. A well-ordered banana peel, or Zorn’s lemon.
3. An elephantine equation.
4. A lemoniskate.
5. An inductive phone booth.
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