

PI DAY 2016

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March 14th was once again a fantastic day for the Department of Mathematics! This year's Pi Day celebration, due to inclement weather, was held in the Garden Court of the Wilkinson Student Center. Hundreds of students gathered to enjoy a magic show, pie-eating contests, face painting, and many more exciting activities and games. Cosmo the Cougar even joined in on the Pi Day fun! "Pi the Professor," an ever-popular activity,

expanded this year to include the new BYU Student Association (BYUSA) Presidents, Addie and Avery. Drs. Michael Dorff and Robin Roundy, along with PhD student Ben Schoonmaker, represented the Department of Mathematics in "Pi the Professor." Students and faculty alike enjoyed this year's Pi Day t-shirts, which are available for purchase on the department website. Additional pictures of the event are available on the

BYU Math Facebook page. The Department of Mathematics staff is already hard at work planning next year's Pi Day festivities!



BYU
MATH

ADVANCEMENTS IN UNDERGRADUATE RESEARCH

Michael Dorff, Department Chair

Last month our College held its 30th Annual Student Research Conference (SRC). Vianey Villamizar organized the mathematics sessions at the SRC in which 66 students (undergraduate and graduate) presented their research on such topics as:

- Improved Modeling for Prosthetic Implants (faculty advisor: Emily Evans)
- A Machine Learning Approach to Predicting the Winner of a Game of Go (faculty advisor: Jeff Humphreys)
- Intrinsic Stability of Discrete and Continuous-Time

Networks (faculty advisor: Ben Webb)

- Stable Orbits in the Two-Center Symmetric Pair Problem (faculty advisor: Lennard Bakker)
- Weak Cayley Table Groups of Wallpaper Groups (faculty advisor: Steve Humphries)
- Isomorphisms of Landau-Ginzberg B-Models (faculty advisor: Tyler Jarvis)

Last year, 82 BYU undergraduate math majors worked with a faculty member on a research project. That is 27% of our majors. This is remarkable. To put this in perspective,

in 2014 some colleagues and I published a report on the amount of undergraduate research being done in mathematics at U.S. universities and colleges. In our survey, the first one done on this topic, we reported that nationally four to five percent of math majors did undergraduate research. So, the BYU Math Department is mentoring about five to six times as many math majors in research than the national average. The mentoring of students by BYU faculty has touched my life.

As an undergraduate math major, my oldest daughter worked with Gary Lawlor on a research project related to the Double Bubble Problem trying to prove the optimal shape two connected bubbles form. Later she was mentored by Jeff Humphreys on a Masters Thesis titled "Modeling Infertility with Markov Chains." Now she works on satellite systems for Raytheon. Mentoring students in research can have a strong impact on students. The success the BYU Department of Mathematics has had in working with



"The BYU Math Department is mentoring about five to six times as many math majors in research than the national average."

students on research is one of the strengths of our department. I would love to hear more success stories of being mentored by a BYU mathematics faculty in research. Please send me your story at mdorff@math.byu.edu.



ALUMNI SPOTLIGHTS

DANIELLE HANKS

Danielle Hanks (BS Mathematics, 2012) participated in the last year of the BYU IMPACT program before it evolved into ACME. After her third year, she took an internship with the National Security Agency, which led to a full-time job offer. The highlight of her time with the NSA was speaking at an

international intelligence community conference in England on a 30-year-old algorithm she improved. After almost three years with the NSA, Danielle accepted an offer at Google as a software engineer in Kirkland, WA. As a starter project, she launched a keyboard shortcuts feature on Google Hangouts last month.

PAUL MERRILL

Paul Merrill graduated with a BS in mathematics from Idaho State University in 1961 and an MS in mathematics from BYU in 1963. After a year with IBM in San Jose, he worked as a systems programmer in the data management area of IBM's Operating System 360 in New York. Then, he began teaching

programming techniques, and managed a software education group at the IBM Santa Teresa Lab. Paul joined IBM's corporate education group and taught software engineering topics in the United States and Asia. He then joined a small company called Intellicorp in Mountain View, CA and became a product

trainer. After two years, he joined the Advanced Concepts Center (ACC) of Lockheed Martin to teach object-oriented software engineering classes. After six years with the ACC, he retired and he and his wife Rae Ann moved from San Jose to the Puget Sound area.

OUTREACH

The Department of Mathematics strives to promote mathematics by reaching out to the community. The department hosts a variety of events designed to pique students' interest in math, recognize their accomplishments, and support their teachers.

AMC8

Each year the department holds a recognition ceremony for students with high scores on the American Mathematics Competition 8 Exam in association with the Mathematical Association of America. The AMC8 is typically taken by those in 6th to 8th grade and no student is more than 14 years old. This year, the event was held on February 25th in the auditorium of the Joseph Smith Building. The department recognized 289 students from 18 different schools with seven of those students scoring in the top one percent. We were pleased to honor Leland Williams, a student who passed away a few months before the ceremony. Leland was one of the distinguished seven students to score over 20 points on the test.



Student Winners from the 2016 AMC8

CENTRAL UTAH STEM FAIR

The Central Utah STEM Fair was held in March at the BYU Conference Center. The Department of Mathematics offered a \$1500 scholarship to the mathematics division winner, Joseph Simmons of American Fork High School. His project was titled, "Physical Random



Congratulations to Joseph Simmons, the 2016 Central Utah STEM Fair Scholarship Recipient

Number Generation using the Inherent Randomness of Combustion Reactions."

HIGH SCHOOL BANQUET

Every November the department hosts a recognition dinner for high school students and teachers in Utah. Teachers nominate those students who demonstrate outstanding performance in mathematics. Students and their parents are then invited to enjoy dinner and

presentations at the High School Banquet, located at BYU. This year, the banquet was held at the Hinckley Alumni and Visitors Center and over 300 people attended. A brief presentation by department faculty members was given about the math major, the Applied and Computational Mathematics Emphasis (ACME), and Careers in Math.

HIGH SCHOOL FIELD TRIP

The BYU Department of Mathematics recently announced an exciting new opportunity: a math field trip for high school students! High school teachers and their advanced math students will be invited to BYU to learn more about mathematics in a fun setting. The three-to four-hour visit features the presentations "Math in Pixar/Disney Movies" and "Math and Soap Bubbles" by Michael Dorff, and "Careers in Math" by Jeff Humpherys. Students will also go to lunch at BYU's Cannon Center.

MATH CAMP

Math Camp is a two-week mathematical experience for middle school and high school students coordinated



Dr. Dorff presents how math applies to real world situations at the High School Banquet

by Dr. David Wright. Students study various topics including Number Theory, Probability and Counting, and Geometry. In 2015, Math Camp had three classes in geometry for 56 middle school students and an advanced class in proofs and contest problem solving for 18 high school students.

MATH CIRCLES

Math Circles was started in 2004 by Drs. Kening Lu and David Wright. Math Circles is a form of outreach and enrichment through which mathematicians and mathematical scientists share their passion with K-12 students. Currently, Math Circles meets on Saturday mornings at BYU, and there are up to five classes for students of different ages and abilities. This program aims to foster



Dr. Ben Webb helps elementary students during Math Circles

an interest in math from a young age, preparing students for an undergraduate education in math.

STATE MATH CONTEST

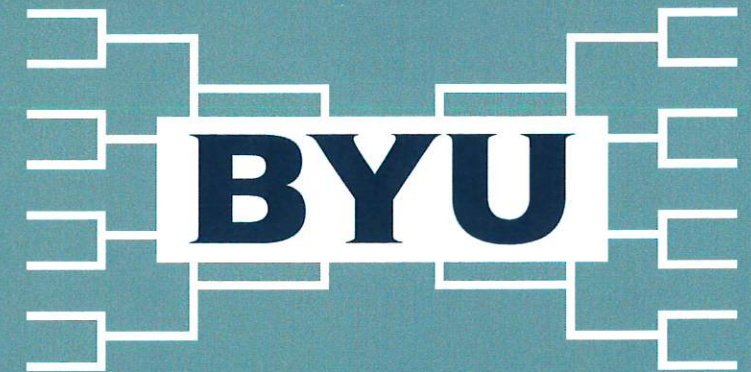
Students in grades 7 through 12 will participate in the Utah State Math Contest on April 25 at BYU, with an awards ceremony to follow in May. Ten students per grade level per school are allowed to compete. Lunch and activities are provided for teachers and students throughout the day. This year, every student taking the exam will receive a BYU Math "Rise to the Equation" t-shirt. Hosting the State Math Contest provides an excellent opportunity for students throughout the state of Utah to explore campus and learn about what BYU has to offer.

TAMI

The Toyota Applied Math Initiative (TAMI) is a professional development workshop for middle school and high school math teachers. The workshop is focused on learning about how math is applied in the real world. The math department invited Utah teachers to join industry and university professionals for four days of presentations at no cost. Last year, topics included math in movies, careers in math, and cryptography.

For more information about any of these events, please contact Katie Jacobson at ktjacobson@math.byu.edu

MATH MADNESS COMPETITION



Retired professor David Wright led a group of 13 high school students to a fifth place finish in the online AMC Interstellar High School Mathematics National Championship "Math Madness".

These students, sponsored by the BYU Department of Mathematics, may be the newest generation of BYU Mathletes. A total of 346 high school teams competed in the Mathematical Association of America-sponsored event. After three preseason contests, BYU's team was put in a bracket with 64 teams with an average team size between 11 and 15 students. The BYU team won its bracket and earned a national fifth place ranking.

The team score is the sum scores of the top five students. In the championship match, BYU defeated eighth ranked Davidson Academy of Nevada by a score of 39 to 34. BYU's top five participants and their respective scores are listed below. All of these contestants are currently in grades 10 and 11 and are likely to compete for BYU again next year.

Dr. Wright invited students who had previously attended BYU Math Camps, BYU Math recognition programs, or with whom he had connections through BYU Math majors and alumni, to join the Math Madness team. Students from out-of-state are able to participate on the BYU team since the competition is entirely online.

Dr. Wright retired in September 2015, but has remained involved in the BYU math community, especially with student outreach programs. He coordinates competitions, math summer camps, and other activities for junior high and high school students, hoping that some of the students will attend BYU and compete on the Putnam mathematics team.

For more information, visit this link: aretelabs.com/math_madness/5/rankings.

NICHOLAS MCCONNELL
10/10



JOSH SPECKMAN
7/10

QUINLAN LESHMAN
7/10



ANNIE YUN
7/10



THOMAS DRAPER
8/10