

Vianey Villamizar

Department of Mathematics – Brigham Young University – Provo, Utah 84602

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Education

Rensselaer Polytechnic Institute

PhD Mathematics

Advisor: Julian D. Cole

Troy, New York

1983-1987

Universidad Central de Venezuela

MS Mathematics

Caracas, Venezuela

1980-1983

Universidad Central de Venezuela

BS Mathematics

Caracas, Venezuela

1972-1977

Areas of Expertise

Wave Phenomena: Acoustic, Electromagnetic, and Elastic Scattering. Absorbing Boundary Conditions

Scientific Computation: High Order Numerical Methods for Partial Differential Equations. Grid Generation.

Experience

Brigham Young University

Professor

Department of Mathematics.

Provo, Utah

2018–present

Brigham Young University

Associate Professor

Department of Mathematics.

Provo, Utah

2001–2018

LDS Church

Mission President (on leave)

Leading about 400 full-time missionaries during three years of voluntary service

Caracas, Venezuela

2011–2014

Brigham Young University

Visiting Associate Professor

Department of Mathematics.

Provo, Utah

2000–2001

Universidad Central de Venezuela

Associate Professor

Department of Mathematics.

Caracas, Venezuela

1994–2000

New Jersey Institute of Technology

Visiting Associate Professor

Department of Mathematics.

Newark, New Jersey

1996–1997

Rensselaer Polytechnic Institute

Visiting Assistant Professor

Mathematical Sciences Department.

Troy, New York

1993-1994

Universidad Central de Venezuela

Aggregate Professor

Department of Mathematics.

Caracas, Venezuela

1989–1993

Northwestern University

Post Doctoral Research Fellow

Engineering Sciences and Applied Mathematics Department.

Mentors: Ed Reiss and Gregory A. Kriegsmann.

Evanston, Illinois

1987–1989

Universidad Central de Venezuela

Instructor

Department of Mathematics.

Caracas, Venezuela

1979–1983

Teaching Experience

Undergraduate Courses: Partial Differential Equations, Ordinary Differential Equations, Numerical Analysis, Multivariable Calculus, Linear algebra, Calculus.

Graduate Courses: Partial Differential Equations, Applied Mathematics, Numerical Solution of Partial Differential Equations, Singular Perturbation Methods, Numerical Analysis.

Peer Reviewed Journal Publications

1. V. Villamizar, J. Badger, and S. Acosta. High order local farfield expansions absorbing boundary conditions for multiple scattering. *J. Comput. Phys.*, 460:(32 pages), 2022
2. V. Villamizar, D. Grundvig, O. Rojas, and S. Acosta. High order methods for acoustic scattering: Coupling Farfield Expansions ABC with Deferred-Correction methods. *Wave Motion*, 95:(24 pages), 2020
3. T. Khajah and V. Villamizar. Highly accurate acoustic scattering: Isogeometric analysis coupled with local high order farfield expansion ABC. *Comput. Methods Appl. Mech. Engrg.*, 349:477–498, 2019
4. V. Villamizar, S. Acosta, and B. Dastrup. High order local absorbing boundary conditions for acoustic waves in terms of farfield expansions. *J. Comput. Phys.*, 333:331–351, 2017
5. D. R. Tengelsen, B. A. Anderson, V. Villamizar, and T. W. Leishman. Finite-difference simulations of transient radiation from a finite-length pipe. *J. Acoust. Soc. Am.*, 135(1):17–26, 2014
6. S. Acosta, S. Chow, J. Taylor, and V. Villamizar. On the multi-frequency inverse source problem in heterogeneous media. *Inverse Probl.*, 28(7):1–16, 2012
7. S. Acosta, V. Villamizar, and B. Malone. The DtN nonreflecting boundary condition for multiple scattering problems in the half-plane. *Comput. Methods Appl. Mech. Engrg.*, 217–220:1–11, 2012
8. S. Acosta and V. Villamizar. Coupling of Dirichlet-to-Neumann boundary condition and finite difference methods in curvilinear coordinates for multiple scattering. *J. Comput. Phys.*, 229:5498–5517, 2010
9. S. Acosta and V. Villamizar. Finite difference on grids with nearly uniform cell area and line spacing for the wave equation on complex domains. *J. Comput. Appl. Math.*, 234:1970–1979, 2010
10. V. Villamizar and S. Acosta. Elliptic grids with nearly uniform cell area and line spacing. *Electron. Trans. Numer. Anal.*, 34:59–75, 2009
11. V. Villamizar and S. Acosta. Generation of smooth grids with line control for scattering from multiple obstacles. *Math. Comput. Simul.*, 79:2506–2520, 2009
12. V. Villamizar, O. Rojas, and J. Mabey. Generation of curvilinear coordinates on multiple connected regions with boundary singularities. *J. Comput. Phys.*, 223:571–588, 2007
13. V. Villamizar and M. Weber. Boundary-conforming coordinates with grid line control for acoustic scattering from complexly shaped obstacles. *Num. Meth. Part. Diff. Eqs.*, 23(6):1445–1467, 2007
14. C. Cadenas, J. Rojas, and V. Villamizar. A least squares finite element method with high degree element shape functions for helmholtz equation. *Math. Comput. Simul.*, 73:76–86, 2006
15. C. Cadenas and V. Villamizar. Comparison of least squares fem, mixed galerkin fem and an implicit fdm applied to acoustic scattering. *Appl. Num. Anal. Comput. Math.*, 128–139, 2004
16. V. Villamizar and O. Rojas. Time-dependent numerical method with boundary-conforming curvilinear coordinates applied to wave interactions with prototypical antennas. *J. Comput. Phys.*, 177:1–36, 2002
17. J. Gomez and V. Villamizar. Response of a viscous incompressible fluid cylinder at low Reynolds number to an incident plane compressional elastic wave. *SIAM J. Appl. Math.*, 56:372–387, 1996
18. V. Villamizar, G. Kriegsmann, and E. Reiss. Acoustic scattering from baffled membranes that are backed by elastic cavities. *Wave Motion*, 14:299–320, 1991

19. V. Villamizar. Elastic scattering from a viscous incompressible fluid sphere at low Reynolds number. *SIAM J. Appl. Math.*, 50:16–32, 1990r
20. H. Power and G. Miranda. Flujo potencial a traves de un cuerpo poroso de forma arbitraria. *Rev. Fac. Ing. UCV*, 2:5–12, 1987
21. H. Power, G. Miranda, and V. Villamizar. Integral equations solution for the flow due to the motion of two bodies at small reynolds number. *Mat. Aplic. Comp.*, 4(1):49–66, 1985
22. H. Power, G. Miranda, and V. Villamizar. Integral-equation solution of potential flow past a porous body of arbitrary shape. *J. Fluid Mech.*, 149:59–69, 1984

Articles under Review or in Preparation

1. M. Quezada, V. Villamizar, and D. Ketcheson. A time-dependent high order local absorbing boundary conditions for acoustic waves. *In its final writing stage*, 2022
2. T. Khajah, V. Villamizar, and J. Hale. Highly efficient numerical method for multiple scattering with high order local ABC . *In its final writing stage*, 2022
3. D. Modesto and V. Villamizar. A comparison of high-order farfield expansions ABC with perfectly matched layer: A finite element approach. *in advanced stage*, 2022
4. V. Villamizar, D. Grundvig, and O. Rojas. High order local ABC for elastic scattering in terms of farfield expansions. *In an advanced stage*, 2022

Peer-Reviewed Conference Proceedings and Book Chapter Publications

1. V. Villamizar, T. Khajah, J. Hale, and M. Jaiswal. An efficient iterative high order numerical method for multiple scattering. In *15th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, pages 1–2, Paris, France, 2022
2. V. Villamizar, J. Badger, T. Khajah, and S. Acosta. High Order Farfield Expansion ABC coupled with IGA and finite differences applied to acoustic multiple scattering. In *14th International Conference on Mathematical and Numerical Aspects of Wave Propagation*, pages 524–525, 2019
3. V. Villamizar, O. Rojas, S. Acosta, and D. Grundvig. High order farfield expansions absorbing boundary condition coupled with high order finite difference methods. In *Proc. 13th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Minneapolis, USA (WAVES 2017)*, pages 385–386, 2017
4. S. Acosta and V. Villamizar. Local absorbing boundary condition for multiple scattering of time-harmonic waves in two dimensions. In *Proc. 13th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Minneapolis, USA (WAVES 2017)*, pages 1–2, 2017
5. V. Villamizar and S. Acosta. Local high-order absorbing boundary condition for multiple scattering of time-harmonic waves. In *Proc. 12th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Karlsruhe, Germany*, pages 444–446, 2015
6. S. Acosta, S.-S. Chow, and V. Villamizar. Multifrequency inverse source problem for elastic waves. In J. Li, H. Yang, and E. Machorro, editors, *Recent Adv. Sci. Comput. Appl.*, volume 586 of *Contemporary Mathematics*, pages 1–8. American Mathematical Society, 2013
7. S. Acosta, S. Chow, J. Taylor, and V. Villamizar. The multi-frequency inverse source problem in acoustics. In *Proc. 10th Conference on Mathematical and Numerical Aspects of Waves, Canada*, pages 411–414, 2011
8. S. Acosta and V. Villamizar. Grid generation with grid line control for regions with multiple complexly shaped holes. In *MASCOT06, IMACS Series in Computational and Applied Mathematics*, volume 11, pages 1–12, 2007

9. S. Acosta and V. Villamizar. Acoustic scattering approximations on elliptic grids with adaptive control functions. In *Proc. 8th International Conference on Mathematical and Numerical Aspects of Waves, Reading, UK*, pages 514–516, 2007
10. S. Acosta and V. Villamizar. Elliptic grid generation methods for scattering from multiple obstacles. In *Proc. Applied Mathematics and Mechanics (PAMM). Special Issue of ICIAM07 Zurich*, volume 7, pages 2020027–2020028, 2007
11. V. Villamizar and M. Weber. Scattering cross section of non-smooth cylindrical obstacles of arbitrary shape. In Haddard and J.D. Hesthaven, editors, *Proc. 7th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Rhode Island, USA*, pages 167–170, 2005
12. C. Cadenas and V. Villamizar. Application of least squares finite element method to acoustic scattering and comparison with other numerical techniques. In G. Psihoyios, editor, *International Conference on Numerical Analysis and Computational Mathematics (NaCoM-2003)*, Cambridge, U.K., pages 32–35, 2003
13. V. Villamizar and R. Jimenez. Scattering cross section of a cylinder at the interface of two acoustic media. In *Proc. 4th International Conference on Mathematical and Numerical Aspects of Wave Propagation, Colorado, USA*, pages 641–644, 1998
14. E. Barrios, E. Correa, A. Crema, P. Marcano, M. Micarelli, G. Miranda, R. Pastoriza, H. Segovia, G. Sepulveda, and V. Villamizar. Smtl: Computational system for fluid pipeline transport models. In *2nd. International Congress Energy, Environment, and Technological Innovations*, volume 2, pages 491–496, 1992
15. H. Power, G Miranda, and V. Villamizar. Regular Perturbations for the Exterior Three-Dimensional Slow Viscous Flow Problem, Tulsa, OK. In *Boundary Elements XIII Comput. Mech., Southampton*, pages 139–148, 1991

Abstracts and Other Publications

1. V Villamizar, T. Khajah, S. Acosta, D Grundvig, J Badger, and O Rojas. High order local absorbing boundary conditions for acoustic and elastic scattering. *Journal of Acoustical Society of America*, 4:2451, 2020
2. V. Villamizar and S. Acosta. Local high-order absorbing boundary condition in terms of farfield expansions. In *Proc. 11th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, Orlando, FL*, page 354, 2016
3. V. Villamizar and S. Acosta. Multiple Dirichlet-to-Neumann boundary condition adapted to scattering in the half-plane. In *Proc. ICTCA 2011 - 10th International Conference on Theoretical and Computational Acoustics*, page 47, 2011
4. D. R. Tengelsen, B. A. Anderson, V. Villamizar, and T. W. Leishman. On the radiation and wave propagation of sound within horns. In *158th Meeting ASA: Journal of the Acoustical Society of America*, volume 126, page 2198. Acoustical Society of America, 2009

Invited Talks

1. **Roosevelt University, Chicago, Illinois:** Highly Accurate Absorbing Boundary Conditions for Acoustic Waves. Department of Physics, 2022
2. **Brigham Young University, Provo, UT:** High Order Numerical Methods for Multiple Scattering in Terms of Farfield Expansions Absorbing Boundary Conditions. Department of Physics, 2022
3. **King Abdulah University of Sciences and Technoogy (KAUST), Saudi Arabia:** High Order Numerical Methods for Acoustic and Elastic Scattering. Computer, Electrical and Mathematical Sciences and Engineering Division, 2021
4. **Barcelona Supercomputing Center (BSC), Spain :** High Order Local Absorbing Boundary Conditions for Acoustic and Elastic Scattering. CASE Seminar, 2021

5. **California Institute of Technology (CALTECH), Pasadena, CA:** High Order Methods for Multiple Scattering in Terms of Farfield Expansions ABC. Department of Computing and Mathematical Sciences, 2019
6. **University of Pau, France:** Open Problems in Wave Scattering. Applied Mathematics Seminar, 2019
7. **Barcelona Supercomputing Center, Spain:** Highly Accurate Wave Scattering Computation: Isogeometric Analysis Coupled with Local High Order ABC. CASE Seminar, 2018
8. **University of California Santa Barbara, CA:** Arbitrarily Accurate Non-Reflecting Boundary Conditions for Acoustic Waves. Department of Mathematics, 2017
9. **University of Utah:** Exact Local Absorbing Boundary Conditions for Acoustic Waves in Terms of Farfield Expansions. Department of Mathematics, 2016
10. **New Jersey Institute of Technology, NJ:** Exact Local Absorbing Boundary Conditions in Terms of Farfield Expansions. Department of Mathematics, 2016
11. **Barcelona Supercomputing Center, Spain:** Local High Order Absorbing Conditions in Terms of Farfield Expansions. CASE Seminar, 2016
12. **Universidad Politécnica de Catalonia, Spain:** Local Absorbing Conditions in Terms of Farfield Expansions. Laboratory of Computational Methods and Numerical Analysis, 2016
13. **Technical University of Berlin, Germany:** Local and Global Absorbing Conditions for Wave Scattering in Unbounded Domains. Department of Mathematics, 2015
14. **Colorado School of Mines, Golden, CO:** Multiple Acoustic Scattering from Complexly Shaped Obstacles. Department of Mathematics, 2010.
15. **University of Delaware, Newark, DE:** Dirichlet to Neumann Boundary Conditions in Generalized Curvilinear Coordinates for Multiple Scattering. Department of Mathematical Sciences, 2008
16. **Brigham Young University, Provo, UT:** Boundary-Conforming Coordinates with Grid Line Control for Acoustic Scattering from Complexly Shaped Obstacles. Department of Physics, 2006
17. **University of California Santa Barbara, CA:** Boundary-Conforming Coordinates with Grid Line Control for Acoustic Scattering from complexly shaped obstacles. Department of Mathematics, 2006
18. **Air Force Research Lab (AFRL), Wright-Patterson, OH:** Boundary-Conforming Coordinates with Grid Line Control for Acoustic Scattering from Complexly Shaped Obstacles, 2005.
19. **University of Washington, Seattle, WA:** Generation of Curvilinear Coordinates with Curve Control on Multiply Connected Regions. Department of Mathematics, 2005
20. **Universidad Central de Venezuela, Caracas, Venezuela:** Numerical Aspects of Wave Scattering. Department of Mathematics, 2004
21. **Universidad Politecnica de Catalonia, Barcelona, Spain:** 'Time-Dependent Numerical Method with Boundary Conforming Curvilinear Coordinates Applied to Wave Interactions with Prototypical Antennas. Department of Applied Math III, 2003.
22. **San Diego State University San Diego, CA:** Time-Domain Numerical Method Applied to Scattering Problems. Department of Mathematics, 1999.
23. **Brigham Young , Provo, UT:** Application of the Time-Domain Numerical Method with Boundary Fitting Curvilinear Coordinates to Scattering Problems. Department of Mathematics, 1997.
24. **Universidad de los Andes, Mérida, Venezuela:** Métodos Numéricos y Asintóticos aplicados a Dispersión Elástica y Acústica. Department of Mathematics, 1995
25. **Universidad Nacional Autonoma de Mexico (UNAM), D.F., Mexico:** Modelos Matemáticos para Simular Transporte de Petroleo y sus Soluciones Numéricas. Instituto de Investigaciones en Matematicas Aplicadas y en Sistemas (IIMAS), 1994.

26. **Universidad de los Andes, Mérida, Venezuela:** Modelos Matemáticos para Simular Transporte de Petróleo y sus Soluciones Numéricas. Department of Mathematics, 1994.
27. **New Jersey Institute of Technology, Newark, NJ:** A Numerical Method Applied to Two Flow Transient Models. Department of Mathematics, 1991.
28. **Universidad de Oriente, Venezuela:** Flujo Transitorio en Oleoductos. Department of Mathematics, 1991.
29. **Universidad Central de Venezuela:** Problemas de Dispersión y Corte Transversal de Dispersión. Fluid Mechanics Institute, 1990.
30. **New Jersey Institute of Technology, Newark, NJ:** Scattering from a Cavity-Backed Membrane Surrounded by an Elastic Layer. Department of Mathematics, 1989.

Conferences Talks

1. **WAVES 2022: 15th International Conference on Mathematical and Numerical Aspects of Wave Propagation:** "An Efficient Iterative High Order Numerical Method for Multiple Scattering," Paris, France, 2022.
2. **AMS Joint Meeting/SIAM Minisymposium on Mathematics of Complex Systems :** "High Order local Absorbing Boundary Condition for the Wave Equation," virtual meeting , 2022.
3. **SIAMGS21: SIAM Conference on Mathematical & Computational Issues in the Geosciences :** "High Order Local Farfield Expansions ABC for Elastic Scattering," virtual from Milan Polytechnic, Italy 2021.
4. **ASA2020: 179th Annual Meeting, Acoustic Virtually Everywhere :** "High order Local Absorbing Boundary Conditions for Acoustic and Elastic Scattering," Virtual, 2020.
5. **WAVES 2019: 14th International Conference on Mathematical and Numerical Aspects of Wave Propagation:** "High Order Farfield Expansion ABC coupled with IGA and Finite Differences Applied to Acoustic Multiple Scattering," Vienna, Austria, 2019.
6. **USNCCM15 2019: 15th biennial congress of the US Association of Computational Mechanics (US-ACM):** "High Order Methods for Multiple Scattering Combining Isogeometric Analysis with Farfield Expansions ABC," Austin, TX, 2019.
7. **International Congress on Industrial and Applied Mathematics (ICIAM2019):** "Local ABC with Farfield Expansions: a Finite Element Approach," Valencia, Spain, 2019.
8. **MCME 2019:** "Local ABC with Farfield Expansions: a High Order Finite Element Approach," Barcelona, Spain, 2019.
9. **ICOSAHOM 2018:** "Highly Accurate Wave Scattering Computation: Isogeometric Analysis Coupled with Local High Order ABC," London, UK, 2018.
10. **IGA 2018: Integrating Design and Analysis:** "Precise Isogeometric Exterior Acoustic Analysis," Austin, TX, 2018.
11. **WCCM 2018: World Congress in Computational Mechanics:** "A Novel Combination of Isogeometric Analysis with Far-field Expansion Absorbing Boundary Conditions for Exterior Acoustic Problems," New York City, NY, 2018.
12. **South Summit:** Army Research Laboratory, "Precise Exterior Isogeometric Scattering Analysis (poster)," Rice University, Houston, TX, 2018.
13. **SIAM 2017:** SIAM Central States Section 2017 Meeting, "Deferred-corrections Fourth and Sixth Order Schemes for Time-Harmonic Acoustic Waves," Fort Collins, CO, 2017.
14. **WAVES 2017:** 13th international Conference on Mathematical and Numerical Aspects of Wave Propagation, "High order farfield expansions absorbing boundary condition coupled with high order finite difference methods," Minneapolis, MN, 2017.

15. **AIMS 2016:** 11th American Institute of Mathematical Sciences Conference, "Local High Order Absorbing Boundary Conditions in Terms of Farfield Expansions," Orlando, FL, 2016.
16. **WAVES 2015:** 12th International Conference on Mathematical and Numerical Aspects of Wave Propagation, "Local High Order Absorbing Boundary Condition for Multiple Scattering of Time-Harmonic Waves," Karlsruhe, Germany, 2015.
17. **ICTCA:** 10th International Conference on Theoretical and Computational Acoustics, "Multiple Dirichlet-to-Neumann boundary condition adapted to scattering in the half- plane," Taipei, Taiwan, 2011.
18. **SIAM Annual Meeting:** "Multiple Scattering from Complexly Shaped Coated Obstacles," Pittsburgh, Pennsylvania, 2010.
19. **11th International Society of Grid Generation Conference:** "Elliptic Grid Generation Methods with Cell Volume Control and their Applications to Multiple Acoustic Scattering," Montreal, Canada, 2009.
20. **MASCOT08:** 8th Meeting on Applied Scientific Computing and Tools: Grid Generation, Approximation and Visualization, "Dirichlet to Neumann Boundary Conditions in Generalized Curvilinear Coordinates for Multiple Scattering," Rome, Italy, 2008.
21. **ICIAM07:** 6th International Congress on Industrial and Applied Mathematics, "Acoustic Scattering from Multiple Complexly-Shaped Obstacles," Zurich, Switzerland, 2007.
22. **WAVES 2007:** 8th International Conference on Mathematical and Numerical Aspects of Waves, "Elliptic Grid Generation with Adaptive Control Functions," Reading, UK, 2007.
23. **Mathematical Association of America Intermountain Conference:** "Grid Generation with Complete Control Applied to Wave Phenomena," SLC, Utah, 2007.
24. **MASCOT06:** 6th Meeting on Applied Scientific Computing and Tools, "Grid Generation Algorithms with Complete Control and its Application to Scattering from Multiple Obstacles Including Boundary Singularities," Rome, Italy, 2006.
25. **WAVES 2005:** 7th Int. Conf. Mathematical and Numerical Aspects of Wave Propagation, "Scattering Cross Section of Non-Smooth Cylindrical Obstacles of Arbitrary Shape," Rhode Island, USA , 2005.
26. **FACM '05:** Frontiers in Applied and Computational Mathematics,, "Grid Generation with Curve Control and its Application in Acoustic Scattering," Newark, NJ, 2005.
27. **SIAM Annual Meeting:** "Automatic Grid Generation with Curve Control over Multiply Connected Regions," Portland Oregon, 2004.
28. **7th US National Congress on Computational Mechanics:** "Boundary-Conforming Curvilinear Coordinates with Grid Curves Control Applied to Scattering from Arbitrary Shape Obstacles," Albuquerque, New Mexico, , 2003.
29. **NaCoM-2003:** International Conference on Numerical Analysis & Computational Mathematics, "Application of Least Squares Finite Element Method to Acoustic Scattering and Comparison with Other Numerical Techniques," Cambridge, UK, 2003.
30. **AMS Western Conference, USA:** "Elliptic Grid Generation with Control of the Coordinate Line Distribution for Multiple Connected Regions," Salt Lake City, Utah, 2002.
31. **SIAM Annual Meeting:** "Derivation of a Conservation of Power Law and Application to the Numerical solution of Scattering from a Prototypical Antenna," San Diego, California, 2001.
32. **WAVES 1998:** Fourth International Conference on Mathematical and Numerical Aspects of Wave Propagation, "Scattering Cross Section of a Cylinder at the Interface of Two Acoustic Media," Golden, Colorado, 1998.
33. **SIAM Annual Meeting:** "Numerical Solution for the Scattering in a Waveguide Using a Grid Generation Technique," Kansas City, Missouri, 1996.

34. **8th Venezuelan School of Mathematics:** Short Course (with A. Arellan): "Studying Differential Equations with MAPLE," Universidad de los Andes, Mérida, Venezuela, 1995.
35. **First International Workshop in Differential Equations and Nonlinear Analysis, Mexico:** "Numerical and Asymptotical Methods Applied to Acoustic and Elastic Scattering," Taxco, Guerrero, 1994.
36. **PanAm 1993:** First Panamerican Workshop in Computational and Applied Mathematics, "Response of a Viscous Incompressible Fluid Cylinder at Low Reynolds Number to an Incident Plane Compressional Elastic Wave," Caracas, Venezuela, 1993.
37. **SIAM Annual Meeting:** "A Novel Lax–Wendroff Type Scheme for Non–Conservative 1–Dimensional Hyperbolic Systems," Los Angeles, California, 1992.
38. **V Jornadas de Matemática de Venezuela:** "Novedoso Esquema Tipo Lax–Wendroff Aplicado al Flujo No Conservativo en Oleoductos," San Cristobal, Táchira, Venezuela, 1992.
39. **ICIAM 1991:** International Conference on Industrial and Applied Mathematics (ICIAM), "Numerical Methods and Accurate Shock Treatment for Isothermal Transients in Oil and Water Pipelines", Washington, D.C, 1991.
40. **Estado del Arte en Mecánica de Fluidos Computacional:** "Two Numerical Methods for Transient Flow in Elastic Pipelines," INTEVEP, Caracas, Venezuela, 1991.
41. **SIAM Annual Meeting:** "Acoustic Scattering from a Baffled Cavity-Backed Membrane surrounded by an Elastic Layer," Minneapolis, Minnesota, 1988.
42. **SIAM Annual Meeting:** "Elastic Scattering from a Viscous Incompressible Fluid Sphere at Low Reynolds Number," Denver, Colorado, 1987.

Students Supervised

Graduates

1. Jonathan Hale (Msc). *Iterative Methods for Multiple Scattering from Complexly Shaped Obstacles*, Department of Mathematics, Brigham Young University, Provo, Utah, 2022.
2. Dane Grundvig (Msc). *High Order Methods in Wave Scattering*, Department of Mathematics, Brigham Young University, Provo, Utah, 2020.
3. Sebastian Acosta (Msc). *A Multi-frequency Inverse Source Problem for the Helmholtz Equation*, Department of Mathematics, Brigham Young University, Provo, Utah, 2011.
4. Jonathan Tyler (Msc). *Analysis and Implementation of High–Order Compact Finite Difference Schemes*, Department of Mathematics, Brigham Young University, Provo, Utah, 2007.
5. Matthew Weber (Msc). *Wave Scattering for Infinite Cylindrical Obstacles of Arbitrary Cross-Section*, Department of Mathematics, Brigham Young University, Provo, Utah, 2004.
6. Otilio Rojas (MSc). *Aplicación del Método Dominio-Tiempo a la Dispersión de Ondas a partir de un Prototipo de Antena*, Department of Mathematics, Facultad de Ciencias, Universidad Central de Venezuela, Caracas, Venezuela, 2000.
7. Mariela Sarmiento (MSc). *Principio de la Amplitud Límite Aplicado a Problemas de Dispersión con Generación de Mallas*, Department of Mathematics, Universidad de los Andes, Merida, Venezuela, 1996.
8. Juan Gomez (MSc). *Respuesta de un Cilindro Lleno con Fluido Viscoso e Incompresible a una Onda Elástica Plana*, Department of Mathematics, Universidad Simon Bolivar, Caracas, Venezuela, 1993.

Undergraduates

1. Jonathan Hale. *Iterative Methods for Multiple Scattering*, Department of Mathematics, Brigham Young University, Provo, Utah, 2020–Present.
2. Jacob Badger. *Local Absorbing Boundary Condition and Scaling for Multiple Acoustic Scattering from Arbitrary Shaped Obstacles*, Department of Mathematics, Brigham Young University, Provo, Utah, 2018–2019.

3. Elizabeth Melville. *Isogeometric Analysis Applied to Wave Propagation Problems*, Department of Mathematics, Brigham Young University, Provo, Utah, 2018–2019.
4. Cole Thatcher. *Isogeometric Analysis Applied to Wave Propagation Problems*, Department of Mathematics, Brigham Young University, Provo, Utah, 2018–2019.
5. Cameron Hernandez. *Isogeometric Analysis Applied to Wave Propagation Problems*, Department of Mathematics, Brigham Young University, Provo, Utah, 2018–2019.
6. Dane Grundvig. *High order Finite Difference Methods Coupled with High order Absorbing Boundary Conditions*, Department of Mathematics, Brigham Young University, Provo, Utah, 2016–2018.
7. Andrew Carr. *Higher Order Finite Difference Methods for Acoustic Scattering*, Department of Mathematics, Brigham Young University, Provo, Utah, 2015–2016.
8. Hugh Bates. *Wave Splitting Techniques for Multiple Scattering Problems*, Department of Mathematics, Brigham Young University, Provo, Utah, 2016.
9. Blake Dastrup. *Local High Order Absorbing Boundary Condition for Multiple Scattering*, Department of Mathematics, Brigham Young University, Provo, Utah, 2015–2016.
10. Ryan Jensen. *Surfaces Waves Scattering*, Department of Mathematics, Brigham Young University, Provo, Utah, 2009 to 2011.
11. Sebastian Acosta. *Scattering from Multiple Complex Obstacles*, Department of Mathematics, Brigham Young University, Provo, Utah, 2006–2009.
12. James Taylor. *Elastic Scattering from Fluid Filled Cavities*, Department of Mathematics, Brigham Young University, Provo, Utah, 2006–2009.
13. Laura Roebeck. *Scattering on Multiple Connected Regions with Boundary Singularities*, Department of Mathematics, Brigham Young University, Provo, Utah, 2005
14. Joseph Mabey. *Automatic Grid Generation with Grid Curve Control*, Department of Mathematics, Brigham Young University, Provo, Utah, 2003-2005.
15. John Robinson. *Acoustic Scattering from Fluid Filled Obstacles*, Department of Mathematics, Brigham Young University, Provo, Utah, 2002-2003.
16. José Luis Piñero. *Problemas de Dispersión de Ondas Acústicas a partir de Cilindros*, Facultad de Ciencias, Universidad central de Venezuela, Caracas, Venezuela, 1996-1998.
17. Rosa Jimenez. *Solución de un Problema de Dispersión de Ondas Acústicas con Aplicación del Principio de la Amplitud Límite*, Department of Mathematics, Facultad de Ciencias, Universidad central de Venezuela, Caracas, Venezuela, 1993-1995.
18. Carmen Astudillo and Elsa Guedez. *Tratamiento de Singularidades en el modelaje de Pozos de un Yacimiento de Petroleo*, (additional mentor Reynaldo Gonzalez, INTEVEP) , Department of Mathematics, Facultad de Ciencias, Universidad central de Venezuela, Caracas, Venezuela, 1991-1993.
19. Otilio Rojas and Alvaro Stephen. *Método en Diferencias No-Conservativo de 2do. Orden Aplicado a un Modelo de Flujo Transitorio en Oleoductos con Seguimiento de Lotes*, Department of Mathematics, Facultad de Ciencias, Universidad central de Venezuela, Caracas, Venezuela, 1990-1992.

Books and Theses

1. "Estudiando Ecuaciones Diferenciales con MAPLE" (with A. Arellan, M. Marcano), *Publicaciones IVIC, Caracas, Venezuela* (ISBN 980-261-032-1), 1995.
2. "Elastic Scattering from a Viscous Incompressible Fluid Sphere," Ph.D. Thesis, Mathematical Sciences Department, Rensselaer Polytechnic Institute, 1987
3. "Solución Mediante Ecuaciones Integrales de Flujo Viscoso y Flujo Potencial Para Medios Porosos," M.Sc. Thesis, Department of Mathematics, Universidad Central de Venezuela, 1983.
4. "Selección Dependiente de la Densidad y la Frecuencia en Poblaciones Biológicas," B.Sc. Thesis, Department of Mathematics, Universidad Central de Venezuela, 1977.

Grants

1. Simons Foundation.
Project: *Construction of Highly Accurate Mathematical Algorithms for Wave Simulations* \$42,000, PI, (declined) 2021.
2. Simons Foundation.
Project: *High Order Methods in Wave Scattering* \$42,000, PI, (declined) 2020.
3. Simons Foundation.
Project: *Highly Accurate Single and Multiple Wave Scattering Computations coupled with High Order Absorbing Boundary Conditions*, \$42,000, PI, (declined) 2019.
4. Simons Foundation.
Project: *High Order Methods in Computational Wave Propagation*, \$42,000, PI, (declined) 2018.
5. National Science Foundation.
Project: *Highly Accurate Wave Scattering Computation: Isogeometric Analysis Coupled with Local High Order Farfield Expansions ABC*, \$209,685, PI, (declined), 2018.
6. MEG-ORCA (BYU research grant).
Project: *Enhancing the Applications of Novel Absorbing Boundary Conditions for Wave Propagation in Unbounded Domains*, \$20,000, PI, 2017-2019.
7. College CHIRPS (BYU research grant).
Project: *Multi-frequency Inverse Source Methods for Magnetoencephalography*, \$29,500, PI. with (Sum Chow and Graduate student Sebastian Acosta), 2009-2011.
8. MEG-ORCA (BYU research grant).
Project: *Wave Scattering*, \$17,400, PI, 2006-2008.
9. Consejo de Desarrollo Científico y Humanístico (Venezuelan NSF).
Project: *Numerical Solution of Acoustic Scattering from a Infinite Fluid Cylinder*, \$100,000, PI, 1995-1998.
10. CORPOVEN (former Venezuelan largest oil company).
Project: *SMTL: Computational System for Fluid Pipeline Transport Models*, \$800,000 with (E. Correa, G. Sepulveda, G. Miranda, and A. Crema), 1991–1995.

Travel Grants

1. Math Department Brigham Young University.
Visit to Barcelona Supercomputing Center, Barcelona, Spain, 2016.
2. Mathematical Sciences Research Institute.
Visit to participate in "Introductory Workshop on Inverse Problems and Applications", UC Berkeley, Berkeley, CA, 2010.
3. Consejo de Desarrollo Científico y Humanístico (Venezuelan NSF).
Visit to Math Dept. Brigham Young University, Provo, Utah, 1999.
4. Universidad de Los Andes, Mérida, Venezuela.
Invited speaker to Summer School, 1997.
5. Consejo de Desarrollo Científico y Humanístico (Venezuelan NSF).
Research visit to Math Dept. New Jersey Institute of Technology, Newark, NJ, 1996-1997.
6. Consejo de Desarrollo Científico y Humanístico (Venezuelan NSF).
Research visit to Math Department Universidad Nacional Autónoma de Mexico, 1994.
7. Consejo de Desarrollo Científico y Humanístico (Venezuelan NSF).
Research visit to Math Department of Rensselaer Polytechnic Institute, Troy, NY, 1993

Awards

1. Fulbright US Scholar Award
Country: Spain,
Bureau of Educational and Cultural Affairs of the United States, Department of State, 2021
2. Invited for a Research Visiting Position.
Division of Applied Mathematics and Computational Science. King Abdulah University of Science and Technology (KAUST), Saudi Arabia, for the Winter Semester 2021.
3. Distinguished Mentoring Award.
BYU Department of Mathematics, 2018 - 2019
4. Distinguished Mentoring Award.
BYU Department of Mathematics, 2009 - 2010.
5. Researcher level 1.
Venezuelan Researchers Promotion System (SPI), 1990-1994, 1996-1998
6. Ph.D. Scholarship for Young Investigators.
Consejo de Desarrollo Científico y Humanístico (Venezuelan NSF), 1983-1987.

Professional and Administrative Activities

1. Organizer of Minisymposium: "in SIAM Conference on Mathematical and Computational Issues in the Geosciences Milan, Italy", 2021.
2. Organizer of Minisymposium: "High Order Numerical Methods for Wave Scattering", ICOSAHOM 2018, London, UK, 2018
3. Referee for the Elsevier Journals: *Mathematics and Computers in Simulation*, *Applied Numerical Mathematics* and *Journal of Computational Physics*.
4. Member of a Panel Discussion: "Using Internet in Teaching", *MAA Intermountain Section Meeting*, Rexburg, Idaho, 2001
5. Member of the Organizing Committee: "First Panamerican Workshop for Applied and Computational Mathematics", Caracas, Venezuela, 1991-1993.

Brigham Young University

1. Council Member of Math Lab Committee, Department of Mathematics, 2022–
2. Council Member of Math Circles Committee, Department of Mathematics, 2022–
3. Council Member of Library Advisory Council, Brigham Young University, 2021–
4. Council Member of Rank and Status Committee College of Physical and Mathematical Sciences, 2021-2022
5. Council Member of Rank and Status Committee department of Mathematics, 2019–2020 and 2021
6. Council Member of University Library Advisory Council, 2022–
7. Course Coordinator of Engineering Math Courses 302 and 303, 2017–2020.
300 students approximately and 4 instructors each semester. Update common Syllabus, Homework, and common exams. Collaborate in the elaboration and administration of Math 302 pretest. Deal with some students problems.
8. Undergraduate Committee Member (Academic Advisement). 2018–2019.
9. Applied Math Seminar and Math Colloquium.
I organized the seminars of three prestigious researchers Tahsin Khajah (Univ of Texas at Tyler), Oscar Bruno (CALTECH) and Symeon Tsynkov (NC State) for our Applied Math Seminar and Colloquium, respectively. 2018-2019.
10. Hiring Committee Member. 2016–2018.
11. Coordinator Numerical Analysis Seminar (2014) and Supporter Applied Math Seminar, 2014–Present.
12. Graduate Committee. TA Training and Evaluations, 2014–2017.

13. Spring Research Conference. Coordinator for the Math Department, 2014–2017.
14. Rank and Status Committee member, 2014–2016.
Classify journals in Applied Math.
15. Course Coordinator of Elementary Linear Algebra (Math 313), 2014–2015.
300 students approximately and about 6 instructors each semester. Introduced common Syllabus, Homework, and common exams.
16. Course Coordinator of Introduction to Calculus (Math 119), 2007–2011.
900 students approximately and 8 instructors each semester. Introduced common exams.
17. Applied Math Committee. Curriculum. 2010–2011.
18. Team Member of Super-Capstone Project at the Mech. Eng. Dept., 2007.
Meet twice a week (4 hours) with faculty and students working in the math modelling and manufacturing of a novel hip replacement.
19. Teaching Assistants Training Coordinator, Dept. of Mathematics, 2001–2006.
An intensive training for all new graduate students on teaching practices and Math Department policies about undergraduate education.
20. Teaching Committee Member, 2004–2006.
21. Lead redefinition of contents of Applied Mathematics Graduate Course (Math 521-522) with Dr. Brent Adams (Mech. Eng. Dept.) and other Math Dept. faculty, 2004–2005.
22. Teaching Committee Chair, 2003–2004.
Arranged peer reviewed teaching evaluations for faculty in the Dept. of Mathematics.
23. Research Area Coordinator, 2002–2003.
Organized a biweekly Applied and Numerical Mathematics Seminar with outside visitors and local faculty.

Universidad Central de Venezuela

1. Founder and Director of the Scientific Computing Laboratory of the Mathematics Department, 1991-1996, 1998-2000.
Lead author of departmental proposals for computing equipment. Hired and supervised computer support students for the lab.
2. Member of the Graduate Committee. Mathematics Department, 1990-1992, 1997-2000.
3. Chairman of the Hiring Committee. Mathematics Department, 1992-1996.