TONATIUH SÁNCHEZ-VIZUET

Assistant Professor Department of Mathematics

Graduate Interdisciplinary Program in Applied Mathematics

•Numerical Analysis •Scientific Computing •Computational Physics

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617 N. Santa Rita Avenue · Tucson, AZ · 85721-0089.

Previous Appointments

Postdoctoral Associate: 2016 – 2020
New York University.
Courant Institute of Mathematical Sciences.

Education

Doctor of Philosophy:
Applied Mathematics, 2016.
University of Delaware.
Department of Mathematical Sciences.
Thesis: "Integral and coupled integral-volume methods for transient problems in wave-structure interaction."
Advisor: Prof. Francisco-Javier Sayas.

Master of Science:
Mathematics, 2011.
summa cum laude
National Autonomous University of México.
Mathematics Institute.
Thesis: "Numerical solution of the Euler equations for gas dynamics in 3D".
Advisor: Prof. Antonio Capella-Kort.

Bachelor of Science:
Physics, 2010.
National Autonomous University of México.
School of Sciences.
Thesis: "Solutions to the transport equation: analytical and numerical properties".
Advisor: Prof. Iouri N. Skiba.

Academic Distinctions & Fellowships

- *William Yslas Velez outstanding faculty advisor award.* University of Arizona, 2024.
- Sigma Xi, scientific honor society. Member since 2021.
- Lathisms honoree, prominent Latinx/Hispanic early career mathematician, 2018 .
- National System of Researchers. Member Level I since 2018. (National Council of Science and Technology, México).
- Departamental Fellowship. University of Delaware, 2014.
- Nomination for the "Excellence in teaching award". University of Delaware, 2012.
- Howard Hughes Medical Institute Teaching Assistant. University of Delaware, 2011-2012.
- Graduate Fellowship. CONACyT 2010-2011. (National Council of Science and Technology, México).
- Research Fellowship. National Autonomous University of México. Center for Atmospheric Sciences, 2008-2009.
- Research Fellowship. National Autonomous University of México. Institute of Nuclear Sciences, 2005.

Research Articles

- E. Henríquez, T. Sánchez-Vizuet, and M. Solano. An unfitted HDG discretization for a model problem in shape optimization. *(Submitted)*, 2025. (arXiv: 2509.22724).
- R. Ceja Ayala, I. Harris, and T. Sánchez-Vizuet. Well-posedness for the biharmonic scattering problem for a penetrable obstacle. *(Submitted)*, 2025. (arXiv: 2506.10176).
- F. Artaza-Covarrubias, T. Sánchez-Vizuet, and M. Solano. A coupled HDG discretization for the interaction between acoustic and elastic waves. *(Submitted)*, 2025. (arXiv: 2505.15106).
- L. H. Baloglou, P. Gill, and T. Sánchez-Vizuet. Lambert's problem in orbital dynamics: a self-contained introduction. *The European Physical Journal Plus*, 141(2), Feb 2026. (arXiv: 2506.10556).
- T. Sánchez-Vizuet. A symmetric boundary integral formulation for time-domain acoustic-elastic scattering. *Computational Mechanics*, 77(3):695–703, Oct 2025. (arXiv:2502.04767).
- H. C. Elman, J. Liang, and T. Sánchez-Vizuet. Surrogate-based multilevel Monte Carlo methods for uncertainty quantification in the Grad-Shafranov free boundary problem. *Computer Physics Communications*, 324:110133, Jul 2026. (arXiv: 2501.08482). Dedicated to the memory of Howard C. Elman.
- T. Sánchez-Vizuet. A boundary integral equation formulation for transient electromagnetic transmission problems on Lipschitz domains. *ESAIM: Mathematical Modeling and Numerical Analysis (M2AN)*, 59(3):1729–1745, May 2025. (arXiv: 2407.05823).
- G. C. Hsiao, T. Sánchez-Vizuet, and W. L. Wendland. Boundary-field formulation for transient electromagnetic scattering by dielectric scatterers and coated conductors. *SIAM Journal on Mathematical Analysis*, 57(2):1502–1525, 2025. (arXiv: 2406.05367).
- H. C. Elman, J. Liang, and T. Sánchez-Vizuet. Multilevel Monte Carlo methods for the Grad-Shafranov free boundary problem. *Computer Physics Communications*, 298:109099, 2024. (arXiv: 2306.13249).
- G. C. Hsiao, T. Sánchez-Vizuet, and W. L. Wendland. A boundary-field formulation for elastodynamic scattering. *Journal of Elasticity*, 153(1):5–27, Dec. 2022. (arXiv: 2206.12587).
- N. Sánchez, T. Sánchez-Vizuet, and M. E. Solano. Afternote to "Coupling at a distance": Convergence analysis and a priori error estimates. *Computational Methods in Applied Mathematics*, 22(4):945–970, July 2022. (arXiv: 2201.01395).
- N. Sánchez, T. Sánchez-Vizuet, and M. Solano. Error analysis of an unfitted HDG method for a class of non-linear elliptic problems. *Journal of Scientific Computing*, 90(3), Feb. 2022. (arXiv: 2105.03560).
- H. C. Elman, J. Liang, and T. Sánchez-Vizuet. Surrogate approximation of the Grad–Shafranov free boundary problem via stochastic collocation on sparse grids. *Journal of Computational Physics*, 448:110699, 2021. (arXiv: 2105.12217).
- G. C. Hsiao and T. Sánchez-Vizuet. Time-dependent wave-structure interaction revisited: Thermo-piezoelectric scatterers. *Fluids*, 6(3), 2021. (arXiv: 2102.04118).
- G. C. Hsiao and T. Sánchez-Vizuet. Boundary integral formulations for transient linear thermoelasticity with combined-type boundary conditions. *SIAM Journal on Mathematical Analysis*, 53(4):3888–3911, 2021. (arXiv: 2010.04909).
- N. Sánchez, T. Sánchez-Vizuet, and M. E. Solano. A priori and a posteriori error analysis of an unfitted HDG method for semi-linear elliptic problems. *Numerische Mathematik*, 148(4):919–958, Aug. 2021. (arXiv:1911.12298).
- T. Sánchez-Vizuet, M. E. Solano, and A. J. Cerfon. Adaptive hybridizable discontinuous Galerkin discretization of the Grad-Shafranov equation by extension from polygonal subdomains. *Computer Physics Communications*, 255:107239, 2020. (arXiv:1903.01724).
- G. C. Hsiao and T. Sánchez-Vizuet. Time-domain boundary integral methods in linear thermoelasticity. *SIAM Journal on Mathematical Analysis*, 52(3):2463–2490, 2020. Dedicated to the memory of Francisco-Javier Sayas (arXiv:1910.04884).
- T. Sánchez-Vizuet and M. E. Solano. A Hybridizable Discontinuous Galerkin solver for the Grad-Shafranov equation. *Computer Physics Communications*, 235:120 – 132, 2019. (arXiv:1712.04148).
- G. C. Hsiao, T. Sánchez-Vizuet, F.-J. Sayas, and R. J. Weinacht. A time-dependent wave-thermoelastic solid interaction. *IMA Journal of Numerical Analysis*, 39(2):924–956, 04 2018. (arXiv:1609.06330).
- T. Sánchez-Vizuet and A. J. Cerfon. Pseudo-spectral collocation with Maxwell polynomials for kinetic equations with energy diffusion. *Plasma Physics and Controlled Fusion*, 60(2):025018, 2018. (arXiv:1708.09031).
- T. S. Brown, T. Sánchez-Vizuet, and F.-J. Sayas. Evolution of a semidiscrete system modeling the scattering of acoustic waves by a piezoelectric solid. *ESAIM: Mathematical Modeling and Numerical Analysis (M2AN)*, 52(2):423–455, 2018. (arXiv:1612.04063).
- T. Sánchez-Vizuet and F.-J. Sayas. Symmetric boundary-finite element discretization of time dependent acoustic scattering by elastic obstacles with piezoelectric behavior. *Journal of Scientific Computing*, 70(3):1290–1315, 2017. (arXiv:1603.00289).
- M. Hassell, T. Qiu, T. Sánchez-Vizuet, and F.-J. Sayas. A new and improved analysis of the time domain boundary integral operators for acoustics. *Journal of Integral Equations and Applications*, 29(1):107–136, 2017. (arXiv:1512.02919).
- G. C. Hsiao, T. Sánchez-Vizuet, and F.-J. Sayas. Boundary and coupled boundary-finite element methods for transient wave-structure interaction. *IMA Journal of Numerical Analysis*, 37(1):237–265, 2016. (arXiv:1509.01713).
- V. Domínguez, T. Sánchez-Vizuet, and F.-J. Sayas. A fully discrete Calderón calculus for the two-dimensional elastic wave equation. *Computers & Mathematics with Applications*, 69(7):620–635, 2015. (arXiv:1409.7653).

Conference proceedings and other publications

- I. Gamba, C. Sormani, T. Tao, L. Greengard, T. Sánchez-Vizuet, and K. R. Payne. The mathematics of Cathleen Synge Morawetz. *Notices of the American Mathematical Society*, 65(07):764–778, Aug 2018.
- G. C. Hsiao, T. Sánchez-Vizuet, F.-J. Sayas, and R. J. Weinacht. FEM-BEM coupling for transient acoustic scattering by thermoelastic obstacles. In *Procceedings 13th. International Conference on Mathematical and Numerical Aspects of Wave Propagation (University of Minnesota)*, 2017.
- T. S. Brown, T. Sánchez-Vizuet, and F.-J. Sayas. Semidiscrete evolution of elastic waves in a piezoelectric solid. In *Procceedings 13th. International Conference on Mathematical and Numerical Aspects of Wave Propagation (University of Minnesota)*, 2017.
- G. C. Hsiao, T. Sánchez-Vizuet, and F.-J. Sayas. A system of boundary integral equations for transient wave-structure interaction. In *Procceedings 12th. International Conference on Mathematical and Numerical Aspects of Wave Propagation (Karlsruhe Institute of Technology)*, 2015.

Funding

- 2021–2023 (renewed until 2025), NSF-DMS-2137305. "LEAPS-MPS: Hybridizable discontinuous Galerkin methods for non-linear integro-differential boundary value problems in magnetic plasma confinement". $250,000. USD.

Talks & Presentations

- "Leveraging partial differential equations and integral equations for efficient equilibrium computations". NSF - Ecosystem for Collaborative Leadership and inclusive Innovation in Plasma Science and Engineering. University of Michigan, May 2026. UPCOMING.
- "An application of the transfer path method to shape optimization".
  12th Metropolitan Congress on Modeling and Numerical Simulation, Mexico City. May 14, 2026. UPCOMING.
- "The wheel, the pendulum and the lion's claw". University of Arizona MathCats Seminar. March 18, 2026.
- "A high order solver for the Grad-Shafranov free boundary problem". Joint Mathematical Meetings, January 6, 2026.
- "An application of the transfer path method to shape optimization". Joint Mathematical Meetings, January 7, 2026.
- "An adaptive unfitted discretization for a free boundary problem in magnetic plasma confinement". Workshop on Interfaces and Unfitted Discretization Methods. Mittag-Leffler Institute, Sweden, November 20, 2025.
- "Pi and a box of matches: Random encounters over a tiled floor". University of Arizona MathCats Seminar. September 26, 2025.
- "The mathematics of things that bend (... a little)". University of Arizona MathCats Seminar. April 7, 2025.
- "Graduate programs in the Mathematical Sciences in the US: overview of the application process". 57th Annual meeting of the Mexican Mathematical Society. Durango, México. October, 2024.
- "Métodos Monte Carlo multi nivel basados en funciones subrogadas para cuantificación de incertidumbre en cálculos de equilibrio de plasmas". Applied mathematics seminar. CIMAT, Guanajuato, México. October 30th, 2024.
- "Surrogate-based multi level Monte Carlo methods for uncertainty quantification in plasma equilibrium computations". Applied mathematics and machine learning seminar. Texas Tech University. September, 2024.
- "A high order solver for the Grad-Shafranov free boundary problem". Plasma physics seminar, University of Texas, Austin. February 20, 2024.
- "A high order solver for the Grad-Shafranov free boundary problem". Computational methods in applied mathematics. 56th Annual meeting of the Mexican Mathematical Society. San Luis Potosí, México. October 27, 2023.
- "Mexican mathematics in North America"(round table). 56th Annual meeting of the Mexican Mathematical Society. San Luis Potosí, México. October 24, 2023.
- "A high order solver for the Grad-Shafranov free boundary problem". Workshop on Acceleration and Extrapolation Methods. ICERM - Brown University. July 28, 2023.
- "A high order solver for the Grad-Shafranov free boundary problem." Computational math seminar, University of Colorado, Boulder. April 27, 2023.
- "Adaptive multi level Monte Carlo methods for uncertainty quantification in plasma equilibrium computations". Seminar on applied mathematics, Universidad Autónoma Metropolitana Iztapalapa (UAM-I), México City, México. March 2, 2023.
- "Some mathematical and computational aspects of magnetic equilibrium in fusion reactors". Seminar on mathematical and computational engineering, University of Concepción, Chile. September 8, 2022.
- "Quantifying the effect of parameter variability in a free boundary problem from magnetic plasma confinement through surrogate models on sparse grids". Center for Computational and Applied Mathematics Seminar, Purdue University. April 11, 2022.
- "Some mathematical and computational aspects of magnetic equilibrium in fusion reactors". Seminar on mathematical and computational engineering, Pontifical Catholic University of Chile. November 23, 2021.

- "A high order Hibridizable Discontinuous Galerkin method for a free boundary problem arising in magnetic confinement of plasmas". 42nd Ibero-Latin-American Congress on Computational Methods in Engineering. Brazil, November 9-12, 2021.
- "A free boundary problem in magnetic plasma confinement: quantifying the effect of parameter variability through surrogate models on sparse grids". SIAM Annual Meeting. July 19-23, 2021.
- "Coupling BIE and HDG: an application to a free boundary problem from plasma physics." XXVI Congreso de Ecuaciones Diferenciales y Aplicaciones / XVI Congreso de Matemática Aplicada. Special minisymposium in memory of Francisco-Javier Sayas. Gijón, Spain, June 15-18, 2021.
- "The hybridizable discontinuous Galerkin method: an application to plasma equilibrium in fusion reactors". Applied Mathematics Research Training Group Seminar, University of Arizona. May 5th, 2021.
- "Boundary integral formulations in transient thermo-elasto dynamics". Analysis, Dynamics, and Applications Seminar, University of Arizona. May 4th, 2021.
- "A boundary integral formulation for transient thermo-elasto dynamics". SIAM conference in computational science and engineering (CSE21). March 1–5, 2021, Fort Worth, Texas.
- "Coupling BIE and HDG: an application to a free boundary problem from plasma physics." Minisymposium: Recent advances in mixed and hybrid discontinuous Galerkin methods. 14th World Congress in Computational Mechanics. Paris, January 11–15, 2021.
- "Some challenges of the computational study of magnetic equilibrium in fusion reactors". Computational and Applied Mathematics Seminar. University of Tennessee, Knoxville. October 21, 2020.
- Outstanding Challenges in Computational Methods for Integral Equations. Banff International Research Station/Casa Matemática Oaxaca. Oaxaca, México. May 31 - June 5, 2020.
- "Quantifying the Uncertainty on Magnetic Equilibrium Computations for Tokamaks". SIAM Conference on Analysis of Partial Differential Equations. December 11, 2019. La Quinta, California.
- "Coupling Boundary Integral Equations and Partial Differential Equations: From wave-structure interaction to magnetic equilibrium in fusion reactors". Applied mathematics seminar. University of Toronto. September 27, 2019.
- "An un-fitted adaptive hybridizable discontinuous Galerkin solver for axisymmetric plasma equilibrium". Sherwood Fusion Theory Conference. Princeton Plasma Physics Laboratory. Princeton, New Jersey. April 15-17, 2019.
- "Computational mathematics: from wave-structure interaction to fusion reactors. Numerical analysis seminar". University of Maryland, College Park. February 12, 2019.
- "Adaptive HDG for semilinear Dirichlet boundary value problems in curved domains". Sixth Chilean Workshop on Numerical Analysis of Partial Differential Equations. University of Concepción, Chile. January 22, 2019.
- "Adaptive HDG for semilinear boundary value problems in curved domains: an application to plasma equilibrium". Applied and Computational Mathematics Seminar. George Mason University. November 30, 2018.
- "Adaptive HDG for semilinear boundary value problems in curved domains: an application to plasma equilibrium". Fluid Mechanics and Waves Seminar. New Jersey Institute of Technology. November 26, 2018.
- "An h-adaptive HDG solver for Dirichlet boundary value problems in curved domains using embedded polygonal grids: an application to plasma equilibrium". Advances in Numerical Approximation of Partial Differential Equations, AMS Sectional Meeting. University of Delaware. September 29-30, 2018.
- The hybridizable discontinuous Galerkin method: an application to plasma equilibrium in fusion reactors. Mexican Mathematicians in the World: Perspectives and Recent Contributions. Banff International Research Station/Casa Matemática Oaxaca. Oaxaca, México. June 10-15, 2018.
- " Hybridizable Discontinuous Galerkin tools for the Grad-Shafranov equation". Sherwood Fusion Theory Conference. Auburn University. Auburn, Alabama. April 23-25, 2018.
- "A Hybridizable Discontinous Galerkin Solver for axisymmetric Plasma equilibrium". Applied mathematics seminar. University of Massachussets, Lowell. April 8, 2018.
- "Hybridizable Discontinuous Galerkin tools for axisymmetric plasma equilibrium". Latinxs in the mathematical sciences, March 8-10, 2018. Institute of Pure and Applied Mathematics, University of California, Los Angeles.
- "A Hybridizable Discontinuous Galerkin solver for axisymmetric plasma equilibrium". Numerical Analysis and Scientific Computing Seminar. Courant Institute of Mathematical Sciences. December 15, 2017.
- "Pseudo-spectral collocation for kinetic equations with energy diffusion". Plasma Physics Seminar. University of Maryland. November 29, 2017.
- "A Hybridizable Discontinuous Galerkin solver for the Grad-Shafranov equation". Mid-Atlantic numerical analysis day. Temple University, Philadelphia, PA. November 3, 2017.
- "Pseudo-spectral collocation for kinetic equations with energy diffusion". Magneto fluid dynamics seminar. Courant Institute of Mathematical Sciences. September 26, 2017.
- "FEM-BEM coupling for transient acoustic scattering by thermoelastic obstacles". WAVES 2017. 13th International conference on mathematical and numerical aspects of wave propagation. University of Minnesota, May 18, 2017.
- "Pseudo-spectral collocation with Maxwell polynomials for kinetic equations with energy diffusion". The Sherwood Fusion Theory Conference 2017. May 1st-3rd, Annapolis, Maryland.

- "BEM/FEM Coupling for transient acoustic scattering by piezoelectric obstacles". SIAM 2016 annual meeting. Boston, Massachusetts. July 11, 2016.
- "Numerical simulation of transient acoustic scattering by a piezoelectric obstacle". DelMar Numerics Day. George Mason University. May 14, 2016.
- "BEM/FEM coupling for transient acoustic scattering by piezoelectric obstacles". Fifth Chilean Workshop on Numerical Analysis of Partial Differential Equations (WONAPDE), University of Concepción, Chile. January 11-15, 2016.
- "Numerical Methods for Time Domain Two-dimensional Wave-structure Interaction". SIAM Conference on Analysis of Partial Differential Equations. December 10, 2015. Arizona.
- "Symmetric BEM/FEM scheme for wave-structure interaction in the time domain". Mid-Atlantic numerical analysis day. Temple University, Philadelphia, Pennsilvania. November 13, 2015.
- "BEM/FEM coupling for transient wave-structure interaction". Finite Element Circus. University of Massachusetts, Dartmouth. October 17, 2015.
- "A system of boundary integral equations for transient wave-structure interaction". WAVES 2015. 12th International conference on mathematical and numerical aspects of wave propagation. Karlsruhe Institute of Technology, Karlsruhe, Germany. July 21, 2015.
- "Time-domain simulation of two-dimensional elastic scattering". SIAM conference on computational sciences and engineering. Salt Lake City, Utah. March 18, 2015.
- "Simulation of linear elastic waves with the Delta Boundary Element Method". Winter research symposium. University of Delaware. February 13, 2015.
- "Transient wave-structure interaction with the Delta Boundary Element method." Poster presentation at the Mid-Atlantic Numerical Analysis Day. Temple University. Philadelphia, Pennsilvania. November 7, 2014.
- "Time-domain Wave-structure interaction with the Delta Boundary Element method". Poster presentation at the Spanish-French School on numerical simulation in physics and engineering. Public University of Navarra. Pamplona, Spain. September, 2014.
- "Boundary integral equations 101". Hallenbeck graduate student seminar. University of Delaware. April 9, 2014.
- "Semi-discrete wave-structure interaction". Poster presentation at the Mid-Atlantic numerical analysis day. Temple University. Philadelphia, Pennsilvania. November 22, 2013.
- "The layman's account on full waveform inversion". Hallenbeck graduate student seminar. University of Delaware. October 23, 2013.
- "On finite volume methods for conservation laws". Hallenbeck graduate student seminar. University of Delaware. May 8, 2013.
- "Implementation of the equal area method for first order conservation laws in Chebfun". Poster presentation at the conference "Chebfun & beyond", University of Oxford. Oxford, United Kingdom. September 18, 2012.
- "Convergence and stability considerations on the numerical solution of transport equations". Mexican Geophysical Union, anual meeting 2010. Puerto Vallarta, México. November, 2010.

Teaching Experience

Courses taught

- Spring 2026. Math 577 (Mathematical Introduction to the Finite Element Method). Instructor. The University of Arizona.
- Spring 2026. Math 523B (Real Analysis II - Core graduate course). Instructor. The University of Arizona.
- Fall 2025. Math 523A (Real Analysis I - Core graduate course). Instructor. The University of Arizona.
- Spring 2025. Math 425B/525B (Real analysis of several variables). Instructor. The University of Arizona.
- Fall 2024. Math 425A/525A (Real analysis of one variable). Instructor. The University of Arizona.
- Spring 2024. Math 523B (Real Analysis II - Core graduate course). Instructor. The University of Arizona.
- Fall 2023. Math 523A (Real Analysis I - Core graduate course). Instructor. The University of Arizona.
- Spring 2023. Math 355 (Analysis of differential equations). Instructor. The University of Arizona.
- Fall 2022. Math 466 (Theory of statistics). Instructor. The University of Arizona.
- Fall 2022. Data 375 (Statistical computing). Instructor. The University of Arizona.
- Spring 2022. Math 363 (Introduction to statistical methods). Instructor. The University of Arizona.
- Fall 2021. Math 363 (Introduction to statistical methods). Instructor. The University of Arizona.
- Spring 2021. MATH 263 (Introduction to statistics and biostatistics). Instructor. The University of Arizona.
- Fall 2020. MATH 125 (Calculus I). Instructor. The University of Arizona.
- Spring 2016. MATH 242 (Calculus and Analytic Geometry B). Teaching assistant. University of Delaware.
- Fall 2015. MATH 241 (Calculus and Analytic Geometry A). Teaching assistant. University of Delaware.

- Fall 2015. MATH 221 (Business Calculus). Teaching assistant. University of Delaware.
- Fall 2014. MATH 512 (Contemporary applications of mathematics). Teaching assistant. University of Delaware.
- Fall 2013. MATH 512 (Contemporary applications of mathematics). Teaching assistant. University of Delaware.
- Spring 2013. MATH 241 (Calculus and Analytic Geometry A). Teaching assistant. University of Delaware.
- Fall 2012. MATH 460 (Introduction to systems biology). *Howard Hughes Teaching Assistant*. University of Delaware.
- Spring 2012. MATH 260 (Integrative seminar). *Howard Hughes Teaching Assistant*. University of Delaware.
- Fall 2011. MATH 241 (Calculus and Analytic Geometry A). Teaching assistant. University of Delaware.
- Fall 2011. Topics on theoretical & mathematical physics. Teaching assistant. National Autonomous University of México, School of Sciences.
- Fall 2011. Mathematics for Applied Sciences II. Teaching assistant. National Autonomous University of México, School of Sciences.
- Spring 2011. Topics on theoretical & mathematical physics. Teaching assistant. National Autonomous University of México, School of Sciences.
- Spring 2010. Vector Mechanics. Teaching assistant. National Autonomous University of México, School of Sciences.
- Fall 2009. Heat transfer, waves & fluids. Teaching assistant. National Autonomous University of México, School of Sciences.

Other teaching-related activities

- **Supervision of graduate research**

  Doctoral

  - Ms. Lenox Baloglou. Ph. D. in Applied Mathematics. The University of Arizona, 2025 – .
    Topic: Computational methods for glacier dynamics.
  - Ms. Parneet Gill. Ph. D. in Mathematics. The University of Arizona, 2024 – .
    Topic: Computational methods for glacier dynamics.
  - Ms. Jiaxing Liang. Ph. D. Applied Mathematics, University of Maryland, College Park, 2018–2024.
    Topic: Computational methods for uncertainty quantification in plasma equilibrium.
    Co-advised with Howard Elman.
    After graduation: Postdoctoral associate. Department of computational and applied mathematics, Rice University.
  - Mr. Nestor Sánchez. Ph. D. in Mathematical Engineering. Universidad de Concepción, Chile, 2018–2021.
    Thesis: Discontinuous Galerkin Methods for Non-Linear Problems in Plasma Physics.
    Co-advised with Manuel Solano.
    After graduation: Postdoctoral associate. Institute of Mathematics, National Autonomous University of México.

  Masters

  - Mr. Fernando Antonio Artaza Covarrubias. Mathematical engineering, University of Concepción, Chile. 2024-2025.
    Thesis: Acoustic scattering and elastic waves: a hybridizable discontinuous Galerkin approach and an incursion in the method of fundamental solutions.
    After graduation: Ph.D. program in Mathematics. Simon Fraser University, Canada.
  - Mr. Esteban Ignacio Henríquez Novoa. Mathematical engineering, University of Concepción, Chile. 2022.
    Thesis: An unfitted hybridizable discontinuous Galerkin method in shape optimization.
    After graduation: Ph. D. program in applied mathamatics. University of Waterloo, Canada.
  - Ms. Vianella Spaeth. Graduate Interdisciplinary Program in Applied Mathematics, University of Arizona 2021. (Unfinished)
    Topic: Computational methods for guidance and interception.
  - Ms. Jiaxing Liang. M.S. Applied Mathematics, Courant Institute 2017-2018.
    Thesis: Iterative methods for Finite Element discretizations of semilinear elliptic equations.
    After graduation: Ph.D. program in Applied Mathematics and Scientific Computing. University of Maryland, College Park.

- **Supervision of undergraduate research**

  - Ms. Hanga Andras-Letanovszky. B. S. in Physics and Mathematics, The University of Arizona, 2025 —
    Topic: Adjoint methods and applications in plasma physics.
  - Ms. Lenox Helene Baloglou. B.S. Mathematics, The University of Arizona, 2023 – 2025.
    Thesis: The Lambert problem of orbital dynamics.
    After graduation: Ph. D. Program in Applied Mathematics at the University of Arizona.
  - Mr. Henry Prior. B.S. Economics and Mathematics, Courant Institute 2017-2018.
    Topic: Newton-Krylov methods for Ill-posed problems / Machine learning methods for differential equations.
    After graduation: Data scientist.

  - Mr. Matthew Moye. B.S. Quantitative Biology, University of Delaware, 2012-2013.
    Topic: Spectral methods for hyperbolic conservation laws.
    After graduation: Ph. D. program in Applied Mathematics at the New Jersey Institute of Technology.

- **Evaluation of Doctoral dissertations**
  - Mr. Bud Denny. Ph. D. in Mathematics. Title: "An unstructured mesh coordinate transformation based FDTD method". University of Arizona. 2024
  - Mr. Paulo Andrés Zúñiga. Ph. D. in Applied Sciences focused on Mathematical Engineering. Title: *"High-order mixed methods in continuum mechanics"*. Universidad de Concepción, Chile (2019).

- **Evaluation of Masters theses**
  - Mr. Bud Denny. Mathematics. Title *"Extended Finite-Difference Time-Domain Method for Dynamics in Ferrite Material"*. University of Arizona (2021).
  - Mr. Ömer Aktepe. Applied Mathematics. Title *"Discontinuous Galerkin methods for one and two dimensional Schrödinger equations"*. University of Arizona (2021).
  - Ms. Ruchi Dahiya. Applied Mathematics. Title: *"Splines, Bezier Curves and Schoenberg Problem"*. University of Arizona (2021).
  - Mr. Fernando Peña. Mathematical Engineering. Title: *"A discontinuous Galerkin method for the heat equation in non poligonal domains"*. Universidad de Concepción, Chile (2020).

- **Graduate review sessions**: Instructor for five week long review sessions for incoming doctoral students at the Department of Mathematical Sciences, University of Delaware. Ordinary differential equations (Summer 2014) and Analysis (Summer 2015).
- **Graduate qualifier preparation sessions**: Instructor for a five week-long review session for first and second year graduate students preparing to take the doctoral qualifying examinations. Analysis (Winter 2015).
- **Orientation for incoming Teaching Assistants**: As part of a University-wide orientation for incoming teaching assistants. Representative for the Department of Mathematical Sciences for the 2015 and 2016 sessions.

Professional Service

Service for professional societies

- Coordinator of the Mexican Mathematical Society's Commission for International Cooperation, February 2026–Present.
- Society for Industrial and Applied Mathematics - Southwest Section. **Founding member** Secretary 2026– .
- Member of the evaluation committee for the Mixbaal prize for best thesis on applied mathematics and scientific computing, 2025. Mexican Society for Scientific Computing and Applications. (Premio Mixbaal, Sociedad Mexicana de computación científica y sus applicaciones).
- Member of the Mexican Mathematical Society's Election Committee (2024-2026).
- Member of the Mexican Mathematical Society's Commission for Global Integration (Comisión de integración global). Since January 2024– January 2026.
- President of the University of Delaware SIAM student chapter. 2012–2013.

Organization of Conferences

- Member of the Scientific Committee for the
  17th International Conference on Mathematical and Numerical Aspects of Wave Propagation, WAVES. Montreal, 2026.
- Member of the Scientific Committee for the 58th. Congress of the Mexican Mathematical Society.
  Puebla, México, October 2025.
- Member of the Scientific Committee for the ISAAC-ICMAM Conference for Women in Mathematics 2024.
  November 27–29, 2024.
- Member of the Scientific Committee for the 57th. Congress of the Mexican Mathematical Society.
  Durango, México, October 2024.
- Member of the Selection Committee for the Fifth Meeting of Mexican Mathematicians in the World.
  Banff International Research Station / Casa Matemática Oaxaca, December 2021.

Organization of Minisymposia

- "Research Highlights from The Southwest Section of SIAM". SIAM Annual meeting. July 6–10, 2026, in Cleveland, Ohio. **UPCOMING**
- "Graduate studies abroad". 57th Annual meeting of the Mexican Mathematical Society. October 2024, Durango, México.
- "Computational methods in applied mathematics". 56th Annual meeting of the Mexican Mathematical Society. October 2023, San Luis Potosí, México.
- "Advances in numerical methods for partial differential equations". 55th Annual meeting of the Mexican Mathematical Society. October 2022, Guadalajara, México. In collaboration with Nestor Sánchez Goycochea.
- "Computational methods in applied mathematics". Annual meeting of the Mexican Mathematical Society. October 2022, Guadalajara, México. In collaboration with Nestor Sánchez Goycochea.
- "Mathematical Challenges in Computational Plasma Physics". SIAM—Analysis of Partial Differential Equations. December 11—14, 2019. La Quinta, CA. In collaboration with Antoine Cerfon.
- "Discontinuous Galerkin approximations in plasma physics: building bridges between theory and applications". Sixth Chilean Workshop on Numerical Analysis of Partial Differential Equations, University of Concepción, Chile. January 21-25, 2019. In collaboration with Antoine Cerfon.

Seminar and colloquium organization

- Organizer of the University of Arizona Mathematics Colloquium (Academic Year 2021-2022).
- Organizer of the "Modelling and computation" seminar. University of Arizona (2021 – Present).

Funding evaluator

- Reviewer/Evaluator for the National Research and Development Agency (ANID) of the Ministry of Science, Technology, Knowledge and Innovation of Chile.
  - Initiation to research FONDECYT grant, 2023.
  - Concurso Nacional de Proyectos Fondecyt Regular, 2026.
- Reviewer/Evaluator for the National Council of Science and Technology (CONACyT), México.
  - National Postdoctoral Fellowship program, 2020, 2021, 2022. (Estancias posdoctorales por México).
  - Frontier science grant program, 2019. (Ciencia de frontera).
  - Department of Energy postdoctoral program, 2018. (SENER Estancias posdoctorales hidrocarburos en México).

Refereeing

- Advances in Computational Mathematics
- AMS-Mathematical Reviews
- Applicable Analysis
- Applied Mathematical Modeling
- Applied Mathematics and Computation
- Boletín de la Sociedad Matemática Mexicana
- Communications in Computational Physics
- Computational and Applied Mathematics
- Computational Methods in Applied Mathematics
- Computer Physics Communications
- Computers and Mathematics with Applications
- Electronic Transactions on Numerical Analysis
- Engineering Analysis with Boundary Elements
- Geoscientific Model Development
- IEEE Transactions on Antennas and Propagation
- IMA Journal of Numerical Analysis
- Indian Journal of Physics
- International Journal for Numerical Methods in Engineering
- International Journal for Numerical Methods in Fluids
- International Journal of Numerical Modelling
- International Journal of Numerical Analysis and Modeling
- Journal of Computational and Applied Mathematics
- Journal of Computational Physics
- Journal of Integral Equations and Applications
- Journal of Numerical Mathematics
- Journal of Mathematical Analysis and Applications
- Journal of Scientific Computing
- Mathematics and Mechanics of Solids
- Mathematics of Computation
- Numerical Methods for Partial Differential Equations
- Proceedings of the Royal Society A
- SIAM Journal of Applied Mathematics
- SIAM Journal of Numerical Analysis
- SIAM Journal of Scientific Computing
- Springer Mathematics book series
- Sustainable energy, grids and networks
- The Graduate Journal of Mathematics