# Johnny Guzmán

Professor
Division of Applied Mathematics
Brown University
182 George St.
Providence, RI, 02912
Johnny_Guzman@brown.edu

## Employment

*Brown University, Division of Applied Mathematics*
2020-            Full Professor
2013-2020      Associate Professor
2008-2013      Assistant Professor

*University of Minnesota, School of Mathematics*
2005-2008      NSF Postdoctoral Fellow (advisor: Bernardo Cockburn)

## Education

*Cornell University*
2005            Ph.D. Applied Mathematics (advisor: Lars Wahlbin)

*California State University-Long Beach (CSULB)*
1999            B.S. Mathematics (primary mentors: Robert Mena and Kent Merryfield)

*Cerritos Community College*
1995-1997      Completed General Education courses

## Journal Articles

*Appeared/ In Press*

1. J. Guzmán, *Quadrature and Schatz's pointwise estimates in finite element methods,* BIT 45 (2005), 695-707.

2. J. Guzmán, *Local analysis of discontinuous Galerkin methods applied to singularly perturbed problems,* J. Numer. Math. 14 (2006), 41-56.

3.  J. Guzmán, *Pointwise estimates for discontinuous Galerkin methods with lifting operators for elliptic problems*, Math. Comp. 75 (2006), 1067-1085.

4.  J. Guzmán*, Local and pointwise error estimates of the local discontinuous Galerkin method for Stokes Problem*, Math. Comp. 77 (2008), 1293-1322.

5.  B. Cockburn, B. Dong and J. Guzmán, *Optimal convergence of the original discontinuous Galerkin method for the transport-reaction equation on special meshes*, SIAM J. Numer. Anal. 46 (2008), 1250-1265.

6.  B. Cockburn and J. Guzmán, *Error estimates for the Runge-Kutta discontinuous Galerkin method for the transport equation with discontinuous initial data*, SIAM J. Numer. Anal. 46 (2008), 1364-1398.

7.  B. Cockburn, B. Dong and J. Guzmán, *A superconvergent LDG-hybridizable Galerkin method for secondorder elliptic problems*, Math. Comp. 77 (2008), 1887-1916.

8.  B. Cockburn, J. Guzmán and H. Wang, *Superconvergent discontinuous Galerkin methods for second-order elliptic problems*, Math. Comp., 78 (2009), 1-24.

9.  E. Burman, J. Guzmán and D. Leykekhman, *Weighted error estimates of the continuous interior penalty method for singularly perturbed problems*, IMA J. Numer. Anal., 29 (2009), 284-314.

10.  J. Guzmán, and B. Riviere, *Suboptimal convergence of nonsymmetric discontinuous Galerkin method for odd polynomial approximations,* J. Sci. Comp., 40 (2009), 273-280.

11. J. Guzmán, D. Leykekhman, J. Rossmann and A. Schatz, *Hölder estimates for Greens functions on convex polyhedral domains and their applications to finite element methods*, Numer. Math., 112 (2009), 221-243.

12. B. Cockburn, B. Dong and J. Guzmán*, A hybridizable and superconvergent discontinuous Galerkin method for biharmonic problems,* J. Sci. Comput., 40 (2009), 141-187.

13. B. Cockburn, J. Guzmán, C.-S. Soon and H. Stolarski, *Analysis of the embedded discontinuous Galerkin method for second-order elliptic problems,* SIAM J. Num. Anal., 47 (2009), no. 4, 2686-2707.

14. B. Cockburn, B. Dong, J. Guzmán, M. Restelli and R. Sacco, *A hybridizable discontinuous Galerkin method for steady state convection-diffusion-reaction problems*, SIAM J. Sci. Comp., 31 (2009), no. 5, 3827-3846.

15. B. Cockburn, J. Gopalakrishnan and J. Guzmán, *A new elasticity element made for enforcing weak stress symmetry*, Math. Comp., 79 (2010), 1331-1349.

16. B. Cockburn, B. Dong, J. Guzmán and J. Qian, *Optimal convergence of the original DG method in special meshes for variable velocity***,** Siam J. Num. Anal., 48 (2010), no. 1, 133-146.

17. J. Guzmán*, A unified analysis of several mixed methods for elasticity with weak symmetry*, J. Sci. Comp., 44 (2010), 156-169.

18. A. Demlow, J. Guzmán, and A.H. Schatz, *Local energy estimates for the finite element method on sharply varying grids,* Math. Comp. 80 (2011), 1-9.

19. W. Wang, J. Guzmán and C.-W. Shu, *The multiscale discontinuous Galerkin method for solving a class of second-order elliptic problems with rough coefficients*, Int. J. Numer. Anal. Model, 8(2011), no. 1, 28-47.

20. J. Gopalakrishnan and J. Guzmán, *A second elasticity element using the matrix bubble*, IMA J. Numer. Anal, to appear.

21. E.M. Behrens and J. Guzmán, *A mixed method for the biharmonic problem based on a system of first order equations*, SIAM J. Numer. Anal, 49 (2011), 789-817.

22. E.M. Behrens and J. Guzmán, *A new family of mixed methods for the Reissner-Mindlin plate model based on a system of first-order equations*, J. Sci. Comp., 49 (2011), 137-166.

23. J. Gopalakrishnan and J. Guzmán, *Symmetric non-conforming mixed finite elements for linear elasticity*, SIAM J. Numer. Anal., 49 (2011), 1504-1520.

24. J. Guzmán and D. Leykekhman, *Pointwise error estimates of finite element approximations to the Stokes problem on convex polyhedra*, Math. Comp., 81(2012), 1879-1902.

25. J. Guzmán and M. Neilan, *A family of non-conforming elements for the Brinkman problem,* IMA J. Numer. Anal., IMA J. Numer. Anal, 32 (2012), no. 4, 1484-1508.

26. J. Guzmán, D. Leykekhman and M. Neilan, *A family of non-conforming elements and analysis of Nitsche's method for a singularly perturbed fourth-order problem*, Calcolo, 49 (2012), 95-125.

27. B. Cockburn, J. Guzmán and F.J. Sayas, *Coupling of RT and HDG with BEM*, *SIAM J. Numer. Anal.* 50 (2012), no. 5, 2778-2801.

28. J. Guzmán and M. Neilan, *Conforming and divergence free Stokes elements on general triangular meshes*, Math. Comp., 83 (2014) , no. 285, 15-36.

29. J. Guzmán, A. Salgado and F.-J. Sayas*, A note one the Ladyzenskaja-Babuska-Brezzi condition*, J. Sci. Comp., 56 (2013), 219-229.

30. J. Guzmán and M. Neilan, *Conforming and symmetric mixed finite elements for plane elasticity using rational bubbles,* Numer. Math., 126(2014), no. 1, 153-171.

31. S. Badia, R. Codina, T. Gudi and J. Guzmán, *Error Analysis of Discontinuous Galerkin Methods for Stokes Problem under Minimal Regularity,* IMA. J. Num. Anal., 34(2014), no.2, 800-819.

32. D. Arnold, R. Falk, J. Guzmán and G. Tsogtgerel, *On the consistency of the combinatorial codifferential*, Trans. Amer. Math. Soc. 366 (2014), no. 10, 5487-5502.

33. T. Gudi and J. Guzmán*, Convergence analysis of the lowest order weakly penalized adaptive discontinuous Galerkin methods*, ESAIM Math. Model. Numer. Anal. 48 (2014), no. 3, 753–764.

34. J. Guzmán and M. Neilan, *Conforming and divergence free Stokes elements in three dimensions*, *IMA J. Numer. Anal.* 34 (2014), no. 4, 1489–1508.

35. *Y. Zhang, W. Wang, J. Guzman and C.-W. Shu, Multi-scale discontinuous Galerkin method for solving elliptic problems with curvilinear unidirectional rough coefficients, J.*

*Sci. Comput.* 61 (2014), no. 1, 42–60.

36. J. Guzmán and C. Klivans, *Chip firing and energy minimization on M-matrices*, *J. Combin. Theory Ser. A* 132 (2015), 14–31.

37. J. Guzmán and M. Sanchez-Uribe, *Max-norm Stability of low order Taylor-Hood elements in three dimensions*, *J. Sci. Comput.* 65 (2015), no. 2, 598–621.

38. J. Guzman, M. Sanchez-Uribe and M. Sarkis, *On the accuracy of finite element approximations to a class of interface problems*, Math. Comp. 85 (2016), no. 301, 2071–2098.

39. M. Ainsworth, J. Guzman and F.-J. Sayas, *Discrete extension operators for mixed methods on locally refined meshes*, Math. Comp., 85 (2016), no. 302, 2639–2650.

40. J. Guzmán, M. Sanchez-Uribe and M. Sarkis, *Higher-order finite elements methods for elliptic problems with interfaces,* M2AN, 50 (2016), no. 5, 1561–1583.

41. J. Guzmán, F. A. Sequeira, and C.-W. Shu, *H(div) conforming and DG methods for incompressible Euler's equations*, IMA J. Numer. Anal. (2016).

42. J. Guzmán, M. Sanchez-Uribe and M. Sarkis, *A Finite Element Method for High-Contrast Interface Problems with Error Estimates Independent of Contrast,* Journal of Scientific Computing 73 (1), 330-365.

43. J. Guzmán and C. Klivans, *Chip-firing on general invertible matrices*, SIAM J. Discrete Math. 30 (2016), no. 2, 1115–1127.

44. E. Burman, J. Guzmán, M. Sanchez-Uribe and M. Sarkis, *Robust flux error estimation of an unfitted Nitsche method for high-contrast interface problems*, *IMA Journal of Numerical Analysis*, 646-668, 2017.

45. J. Guzmán and M. Olshanskii, *Inf-sup stability of geometrically unfitted Stokes finite elements,* Math. Comp. 87 (313), 2091-2112, 2018.

46. J. Guzmán and R. Scott, *The Scott-Vogelius finite elements revisited*, Math. Comp., **88**, 515-529, 2019.

47. J. Guzmán A. Madureira, M. Sarkis and S. Walker, *Analysis of the finite element method for the Laplace--Beltrami equation on surfaces with regions of high curvature using graded meshes*, Journal of Scientific Computing 77 (3), 1736-1761, 2018.

48. J. Guzmán and M. Neilan, *Inf-sup stable finite elements on barycentric refinements producing divergence-free approximations in arbitrary dimensions*, SIAM Journal on Numerical Analysis 56 (5), 2826-2844, 2018.

49. J. Guzmán and R. Scott, *Cubic Lagrange elements satisfying exact incompressibility, SMAI-Journal of computational mathematics*, 4, 345--374, 2018.

50. G. Fu, J. Guzmán and M. Neilan, *Exact smooth piecewise polynomial sequences on Alfeld splits*, Mathematics of Computation. 2020;89(323):1059-91.

51. J. Guzmán, A. Lischke, and M. Neilan. *Exact sequences on Powell-Sabin splits,* Calcolo. 2020 Jun; 57(2):1-25.

52. E. Cáceres, J. Guzmán and M. Olshanskii, *New stability estimates for an unfitted finite element method for two-phase Stokes problem,* SIAM Journal on Numerical Analysis. 2020; 58(4):2165-92.

53. G. Barrenechea, E. Burman, and J. Guzmán, *Well-posedness and H (div)-conforming finite element approximation of a linearised model for inviscid incompressible flow,* Mathematical Models and Methods in Applied Sciences. 2020, Jan 14.

54. E. Burman, R. Durst and J. Guzmán, *Stability and error analysis of a splitting method using Robin-Robin coupling applied to a fluid-structure interaction problem*, Numer. Methods Partial Differ. Eq.. (2021), 1-11.

55. T. Dupont, J. Guzmán, R. Scott, *Obtaining higher-order Galerkin accuracy when the boundary is polygonally approximated*, 2020, submitted.

56. D. Boffi, J. Guzman, M. Neilan, *Convergence of Lagrange finite elements for the Maxwell Eigenvalue Problem in 2D*, IMA J. Num. Anal., accepted.

57. Burman E, Durst R, Fernández MA, Guzmán J. *Fully discrete loosely coupled Robin-Robin scheme for incompressible fluid-structure interaction: stability and error analysis,* 2020, Numer. Math, to appear.

58. N. Ahmed, G.R. Barrenechea, E. Burman, J. Guzmán, A. Linke, C. Merdon, *A pressure-robust discretization of Oseen's equation using stabilization in the vorticity equation,* SINUM. 2021;59(5):2746-74.

59. G. Awanou, M. Fabien, J. Guzmán, A. Stern, Hybridization and postprocessing in finite element exterior calculus, 2020, Math. Comp., to appear.

60. J. Guzmán, A. Lischke, M. Neilan, *Exact sequences on Worsey-Farin Splits*, 2020, Math. Comp, to appear.

61. S.H. Christiansen, J. Gopalakrishnan, J. Guzmán, K. Hu, *A discrete elasticity complex on three-dimensional Alfeld splits*, 2020, submitted.

62. J. Guzmán, A.J. Salgado, *Estimation of the continuity constants for Bogovskii and regularized Poincare integral operators*, Journal of Mathematical Analysis and Applications. 2021 Oct 1;502(1):125246.

63. E. Burman, J. Guzmán, *Implicit-explicit multistep formulations for finite element discretisations using continuous interior penalty*, ESAIM: M2AN, available online.

64. D. Arnold, J. Guzmán, *Local L2-Bounded commuting projections in FEEC*, ESAIM: M2AN, 55 5 (2021) 2169-2184.

65. M. Fabien, J. Guzman, M. Neilan, A. Zytoon, *Low-order divergence-free approximations for the Stokes problem on Worsey–Farin and Powell–Sabin splits*, Computer Methods in Applied Mechanics and Engineering. 2022 Feb 15; 390:114444.

66. Burman E, Durst R, Fernández M, Guzmán J. *Loosely coupled, non-iterative time-splitting scheme based on Robin-Robin coupling: Unified analysis for Parabolic/Parabolic and Parabolic/Hyperbolic problems*. J. Num. Math., to appear.

67. A. Salazar-Coariti, M. Fabien, J. Guzmán, J. McGuire, R. De Vita, K. Touissaint, *Fluid mechanics approach to analyzing collagen fiber organization*, J. BioMed Optics, to appear.

68. D. Boffi, S. Gong, J. Guzmán, M. Neilan*, Convergence of Lagrange Finite Element methods for the Maxwell Eigenvalue Problem in 3D*, submitted.

69. S. Gong, J. Guzmán, M. Neilan, *A note on the shape regularity of Worsey-Farin Splits,* submitted.

70. G. Barrenechea, E. Burman, E. Caceres, J. Guzmán*, Continuous Interior Penalty stabilization for divergence-free finite element methods*, submitted.

71. E. Burman, D. Garg, J. Guzmán*, Implicit-explicit time discretization for Oseen's equation at high Reynolds number with application to fractional step methods*, submitted.

## Conference Proceedings

1. AC. Coariti, M. Fabien, J. Guzman, K.C. Toussaint, Quantitative second-harmonic generation imaging analysis based on fluid-dynamics measures. InFrontiers in Optics 2020 Sep 14 (pp. FW5E-1). Optical Society of America.

### Selected Presentations

- Seminar, INRIA-Paris, Oct. 2022.
- Seminar (Virtual), IIT-Roorke, Mar. 2022.
- Seminar (Virtual), Irish Numerical Analysis Forum, Feb. 2022.
- Mini-symposium (Virtual), AMS Fall Sectional Meeting, Omaha NE, Oct. 2021.
- Mini-symposium (Virtual), Mathematical Congress of the Americas, July 2021.
- Seminar, Australian seminar on computational mathematics, Mar. 2021
- Colloquium (Virtual), Mathematics Department, Howard University, Nov. 2020.
- Seminar (Virtual), Mathematics Department, Universidad de Colombia-Bogota, Nov. 2020.
- Seminar, STEM Jazz seminar, Brown University, Feb. 2020.
- Dynamics, Equations and Applications Conference, Krakow, Poland, Sept. 2019,
- Scientific computing seminar, University of Nottingham, Nottingham, U.K., Sept. 2019.
- 32nd Coloquio Brasiliero, mini-symposium talk, Aug. 2019, Rio de Janiero, Brazil.
- ICIAM, mini-symposium talk, July 2019, Valencia, Spain.
- Structure Preserving discretizations: FEMs, Splines and IGA, Pittsburgh, June 2019.
- Oxford University, Mathematical Institute, Oxford, UK, May 2019.
- SIAM TX-Louisiana sectional conference, LSU-Baton Rouge, Oct. 2018.

- Advances in PDEs: Theory, Computation and Application to CFD, ICERM, Aug. 2018.

- MSRI-UP colloquium, Berkeley, June 2018.

- SIAM Southeastern Atlantic sectional conference, UNC-Chapel Hill, March 2018.

- Applied and computational math colloquium, U. Minnesota, Feb. 2018.

- Scientific Computing around Louisiana (SCALA), LSU, Feb. 2018.

- Computational and Applied Mathematics Colloquium, U. Chicago, Nov. 2017.

- Modern Math Workshop (SACNAS), Salt Lake, Oct. 2017

- Recent Advances and Challenges in Discontinuous Galerkin Methods and Related Approaches, Minneapolis, June 2017.

- Blackwell-Tapia Conference, U. Tennessee, Oct. 2016

- Scientific computing seminar, Institut de Mathematiques de Bordeaux, Sept. 2016

- Computational and Applied Mathematics Seminar, U. Tennessee. Mar. 2016

- Scientific computing seminar, U. Houston, Mar.  2016

- Applied Mathematics Colloquium, NJIT, Jan. 2016

- SACNAS national conference, D.C., October 2015

- Three mini-symposium talks at ICIAM,  Beijing, July 2015

- Advanced Numerical Methods in the Mathematical Sciences, Texas A & M, May 2015

- Numerical Methods for Partial Differential Equations, MIT, April 2015.

- Numerical Analysis Seminar, Universidad Nacional de Colombia- Bogota, Nov. 2014

- Structure Preserving Discretizations, IMA, Oct. 2014

- Durham LMS-EPSRC Symposium,  Durham England, July 2014

- Robust Discretization and Fast Solvers for Computable Multi-Physics Models, ICERM, May 2014.

- Numerical Analysis Seminar, U. Pittsburgh, March. 2014

- Numerical Analysis Seminar, IISC, Bangalore, May 2013.

- Numerical analysis seminar, U. Maryland, Nov. 2012

- Mini-symposium talk, WCCM, Sao Paulo, July 2012

- Seminar, CIMNE, UPC, Barcelona, June 2012

- Numerical analysis seminar, U. Pittsburgh, Mar. 2012

- Numerical analysis seminar, Courant Institute, NYU, Nov. 2011

- Finite Element Circus, U. Connecticut, Oct. 2011

- Two mini-symposium talks at ICIAM, Vancouver, July 2011

- Numerical Methods for Incompressible Fluid Flow Workshop, UBC, Vancouver, July 2011

- Analysis and PDE Seminar, U. Delaware, March 2011.

- Mini-symposium presentation, SIAM annual meeting, Pittsburgh, July 2010

- Plenary talk, SIDIM, Univeristy of Puerto Rico-Mayagüez, Feb. 2009

- Mathematics Colloquium, WPI, Worcester, MA, Nov. 2009

- Applied Math Seminar, IMPA, Rio de Janeiro, Brazil, April 2009

- Three talks at MAFELAP, Brunel U., United Kingdom, June 2009

- Finite Element Circus, U. Delaware, DE, May 2009

- Applied Math Seminar, Michigan State U., East Lansing, MI, Mar. 2009

- Finite Element Circus, RPI, Troy, NY, Oct. 2008

- Computational and Applied Mathematics Seminar, UCI, Irvine, CA, April 2008

- Special Colloquium, Brown U., Providence, RI. Jan. 2008

- Special Colloquium, LSU, Baton Rouge, LA, Jan. 2008

- Numerical Analysis Seminar, Texas A&M, College Station, TX, Dec. 2007

- Special Colloquium, University of Illinois-Chicago, Chicago, IL, Dec. 2007

- BIRS meeting on DG methods, Banff, Alberta Canada, Nov. 2007

- Special Numerical Analysis/PDE seminar, U. of Kentucky, Lexington, KY, Sep. 2007

- Finite Element Circus, University of Maryland , College Park, MD, April 2007

- Computational and Applied Math Colloquium, Rice U., Houston, TX, April 2007

- Finite Element Circus, Penn State U., State College, PA, Nov. 2006

- DG mini-symposium, 7th World congress on computational mechanics, Los Angeles, CA, July 2007

- DG mini-symposium,  AMS annual conference, Atlanta, GA, Jan. 2005

- Workshop on Numerical Approximations to PDE, Concepcion, Chile, Jan. 2004

Workshops or conferences attended (no talk given)
- Theory and Applications of discontinuous Galerkin methods, Oberwolfach, Feb. 2012
- Blackwell-Tapia conference, 2012, 2018.
- Mathematical Analysis of Turbulence, IPAM, Sep. 2014.
- SACNAS National Conferences, 2013, 2016, 2017.
- CAARMS, 2015.
- Pan-American Workshop Applied Mathematics and Computational Sciences, Varadero, Cuba, 2018.
- Celebrating 75 years of Mathematics of Computation, ICERM, Nov. 2018.

- Nonstandard FEM, Oberwolfach, Jan. 2021 (virtual).

# Grants

*Completed Grants*

- NSF, Division of Mathematical Sciences, Postdoctoral Research Fellowship, 2005-2008, PI, $108,000
- NSF, Division of Mathematical Sciences (SCREMS), # 0922803, 2009-2011, CO-PI, $86,420
- CBMS/NSF (grant to organize workshop in June 2012), # DMS-1138011, 2012, PI,  $43,648

- NSF, Division of Mathematical Sciences, # 0914596, 2009-2012, PI, $189,826

- NSA, REU Grant, # 003967, Summer 2014, PI, $61,706
- ARO, Conference Grant, GR5212022, Dec. 2016, PI, $14,950
- ONR, Conference Grant,  GR5250018, Dec. 2016, PI, $18,389
- AFOSR, Conference Grant, GR5210010, Dec. 2016, PI, $ 23,201
- NSF, Division of Mathematical Sciences, Title: *Topics in the analysis of finite elements,* #1318108, 2013-2016, PI, $210,000

- NSF, Division of Mathematical Sciences*, Title: Topics in Finite Element Analysis,* #1620100, 2016-2020. $210,000.

*Current Grants*

- Brazil Collaboration Grant (Internal), Co-PI, $19,576.

- NSF, Division of Mathematical Sciences*, Title: Finite Element exterior Calculus with smoother piecewise polynomial, #1913083,* 2019-2022, $300K.

*Grants that were not funded*

- NSF, RTG: Advanced Numerical Modeling: Analysis and Design, PI, $2,671,188. Submitted in 2016.

- DOE, EPSCOR, Efficient high order numerical methods guided by optimization techniques for partial differential equations arising in energy sciences,  PI, $2,954,315, submitted March 2019.

**Service**

*University Service*

- Member of 2008 search committee for Prager Assistant Professor
- Applied mathematics library representative for 2009
- Mentor for Brown University's African, Latino, Asian and Native American (ALANA) mentoring program, 2008-2009 and 2009-2010
- Served on several Ph.d. thesis committees
- Given several prelim exams
- Concentration advisor, 2011-2013, 2021-
- First Year Advisor, 2011-2016, 2018-2019
- Graduate Committee member 2013-2017
- Graduate Director, 2017-2020
- IMSD Associate Director, 2016-2018
- Ran the Kobe-Brown Simulation School 2016.
- Member of the applied mathematics diversity and inclusion plan committee, 2016, Fall 2021.
- Ran two small REUs (four participants each summer) in summers of 2013 and 2014.

*Professional Service*

- Editorial Board:
  1) Journal of Numerical Mathematics
  2) Journal of Scientific Computing (2014-2020)
  3) Mathematical Models and Methods in Applied Sciences (M3AS)
  4) Calcolo
  5) La Matematica

- EDGE summer program, faculty mentor, summer 2020.

- Edge summer program, local co-organizer, summer 2023

- SIAM Council Member 2023-2025

- Reviewed a proposal for new master's program in a Chilean university

- Was part of the external review committee for PhD proposal for the math program in the University of Texas Rio Grande

- Co-organizer of the ICERM workshop Advances in PDEs: Theory, Computation and Application to CFD, ICERM, Aug. 2019.
- Co-organizer of BIRS workshop on Numerical analysis of coupled and multi-physics problems with dynamic interfaces, Oaxaca, July 2018.
- Co-taught a summer course in the Instituto de Matematicas UNAM-Queretaro, July

2018.
- Gave a mini course at the Modern Math workshop in SACNAS, Salt Lake, Oct. 2017.
- Co-taught a three week course in the African Institute of Mathematics-Senegal, Jan. 2017.
- Co-organizer of the conference *Frontiers in Applied and Computational Mathematics*, Providence, Jan. 2017.
- Co-organized mini-symposium at WONAPDE, Concepcion, Chile, Jan. 2016.
- AMS prize committee, 2014-2016
- AMS Birman Prize committee, 2021-2024
- AMS Committee on Meetings and Conferences, 2021-2024
- SIAM Dahlquist prize committee, 2020.
- Co-organizer of CBMS workshop on Finite element exterior Calculus, ICERM, Providence, June 2012
- Local organizer for Finite Element Circus Conference in the Spring 2010, Brown University
- Guest organizer of Finite Element Circus Fall 2010, IMA.
- Co-organized the DG mini-symposium in the 2009 MAFELAP conference, Brunel U., UK
- NSF panel member 2009, 2013, 2014, 2016, 2020, 2021 (CAREER award)
- DOE panel member 2021 (CAREER award)
- Poster Judge at the 2006, 2007 and 2009 national conferences of the Society for the Advancement of Chicanos and Native-Americans in Science


**Awards and Honors**

| | |
|---|---|
| 2013 | Comfort and Urry Family Fund Prize |
| 2005 | NSF Postdoctoral Fellowship |
| 1999 | Ford Foundation and Cornell-Sloan Fellowships |
| 1999 | CSULB's Outstanding Graduate in Mathematics |


**Teaching**

*Brown University*
- Fall 2008,  APMA 0340, Introduction to Differential Equations
- Spring 2009, Spring 2011, Spring 2017, APMA 1180, Introduction to Numerical Solution to Differential Equations
- Fall 2009, Fall 2011, Fall 2015 and Spring 2020, APMA 2570, Numerical Solution to Partial Differential Equations III
- Spring 2010, Spring 2012,  Spring 2014, Spring 2016, APMA 0160, Introduction to Scientific Computing
- Fall 2016, Fall 2020, Fall 2021, Fall 2022, APMA  2550, Numerical Solutions to Partial Differential Equations I
- Fall 2012, Fall 2018, APMA 1170, Computational Linear Algebra
- Fall 2013, APMA 1930L, Fast methods in scientific computing

- Fall 2014, APMA 2580, Computational Fluid Dynamics
- Fall 2017, APMA 2881X, Finite Element Exterior Calculus
- Spring 2021, APMA 1720, Monte Carlo Simulations with applications to Finance

*University of Minnesota*
- Calculus
- Sequences, Series and Foundations

*Cornell University*
- Calculus (as Ph.D Student)
- Real Analysis (in the Summer Math Institute)

*African Institute of Mathematics-Sengal*
- Introduction to numerical methods for elliptic PDEs. This was a three week course were students learned basic finite difference and finite element methods. This took place Jan.2017 and was co-taught with Gerard Awanou.

**Visitors for one month or more**

- Edwin M. Behrens, Catholic University of Concepcion-Chile, Fall 2009.
- Thirupathi Gudi, Indian Institute of Science, mid July- mid August of 2012.
- Alexandre Madureira, LNCC, Brazil, August 2015-July 2016.
- Marcus Sarkis, WPI, August 2015-July 2016.
- Douglas Arnold, UMN, Nov. 2016.
- Jay Gopalakrishnan, Portland State, Feb. 2018 (two weeks).
- Javier Sayas, U. Deleware, March-April 2018.

**Research Supervision**

**Past Ph.D. Students**

- Manuel Sanchez-Uribe, Graduated May 2016

  Thesis Title: Analysis and Development of Finite Element Methods for Interface Problems

  First position: Dunham Jackson Assistant Professor at University of Minnesota
  Current Position: Assistant Professor of Mathematics at the Catholic University of Chile, Santiago, Chile

- Filander Sequeira, Graduated Dec. 2015, Ph.D. granted by Universidad de Concepcion, Chile,  co-advised with Gabriel Gatica

  Thesis Title: Metodos de Elementos Fnitos Mixtos y Afines para Problemas No-lineales y de Transmision en Mecanica de Medios Continuos.

  First (and current) Position: Assistant Professor, Universidad Nacional de Costa Rica

- Anna Lischke, Graduated Aug. 2020

  Thesis Title: Exact Smooth Piecewise Polynomial Sequences on Powell-Sabin and Worsey-Farin Splits.

  First position: Mathworks, Software Engineer.


- Rebecca Durst, Graduated May 2022

  Thesis Title: Recent advances in splitting methods based on Robin-Robin coupling conditions

  First Position: Postdoc, University of Pittsburgh

- Ernesto Caceres, Graduated Aug. 2022

  Thesis Title: Analysis and implementation of some stabilized finite element methods applied to fluid mechanics

  First Position: Postdoc, Worcester Polytechnic University


**Current Ph.D. Students**
- Sining Gong-anticipated graduation date: May 2023