Andrea Bonito
Department of Mathematics
Texas A&M University
College Station, TX 77843-3368

BONITO@MATH.TAMU.EDU
people.tamu.edu/∼bonito

September 13, 2023

Research Interests

Numerical analysis of partial differential equations and scientific computing

Complex Flows
Deterministic and stochastic viscoelastic flows with free surface, bouncing jets.

Geometric Partial Differential Equations
Curvature driven flows, Willmore and Helfrich flows, biomembranes, electrowetting, crystal surfaces relaxations, bending actuators, foldings of thin structures.

Finite Element Methods
Free boundary problems, optimality of adaptive methods, eigenvalue problems, shock capturing methods, fractional operators and parametric partial differential equations, optimal learning.

Education & Qualification

Highest degree: PhD in applied mathematics (EPFL, 2006)

ANTARES, Qualification for "Maître de Conférences" (26), 2007.

Ecole Polytechnique Fédérale de Lausanne, PhD thesis no 3490 in applied mathematics entitled *"Analysis and Numerical Simulation of Viscoelastic Flows : Deterministic and Stochastic Models"*. Advised by Dr M. Picasso. Committee: Prof. R. Dalang (chair), Prof. Ph. Clément, Prof. R. Glowinski & Prof. A. Quarteroni, 2006.

Ecole Polytechnique Fédérale de Lausanne, combined bachelor and master degree in mathematical engineering, 2002.

Professional Experiences

Current Appointment: Professor and President of the SIAM Texas-Lousiana section

[2022 -] Elected President of the **SIAM Texas-Lousiana** section.

[2019 -] Liaison officer for the **SIAM Texas-Lousiana** section.

[2015 -] Professor, Department of Mathematics, **Texas A&M University**.

[2019 - 2022] Primary advisor for the Texas A&M AMS graduate student chapter.

[2019 - 2022] Associate Head for Graduate Studies, Department of Mathematics, **Texas A&M University**.

[2013 - 2015] Associate Professor, Department of Mathematics, **Texas A&M University**.

[2008 - 2013] Assistant Professor, Department of Mathematics, **Texas A&M University**.

[2006 - 2008] Postdoctoral fellow, Department of Mathematics, **University of Maryland**.

[1999 - 2006] Research and teaching assistant, Institut d'Analyse et Calcul Scientifique, **Ecole Polytechnique Fédérale de Lausanne**.

[2001] Diploma work during internship at **European Aeronautic Defense and Space** (EADS) in Paris/France, six months.

[2001] Part-time consulting in mathematics at **Nestlé-Suisse** in Vevey/Switzerland, division alimentaire.

[2000 - 2001] Part-time consulting in mathematics at **2C3D S.A.**

[1998 - 1999] Summer Internships at **Centre Européen de Recherche Nucléaire** (CERN) in Meyrin/Switzerland.

Grants

Continuous and complete funding since first year appointment.

[13] National Science Foundation grant *"Finite Element Approximations of Developable Surfaces with Curved Folds"* (DMS-2110811). PI - Single Investigator Grant, *$300,000*, 2021-2024.

[12] IMA 2020-2021 PI Conference Award for the *"3rd Annual Meeting of the SIAM Texas-Louisiana Section"*. *$4,000*, 2020.

[11] National Science Foundation grant *"Finite Element Approximations of Bending Actuated Devices"* (DMS-1817691). PI - Single Investigator Grant, *$272,414*, 2018-2021.

[10] Vice President for Research supplemental funding (with R. DeVore and G. Petrova), Texas A&M, *$270,000*, 2019-2021.

[9] Office of Naval Research / DURIP grant *"High Performance Computational Structure for Parameter Estimations of Parametric Partial Differential Equations"* (N00014-17-1-2908), co-PI (PI: R.A. DeVore, CoPI: G. Petrova), *$171,336*, 2017-2018.

[8] Oak Ridge National Laboratory / DARPA grant *"Foundation of Rigorous Mathematics for Uncertainty Quantification in Large Systems at Extreme Scale"*, co-PI (PI: R.A. DeVore, CoPI: G. Petrova), Phase I: *$158,136*, 2015-2017.

[7] Air force office of scientific research grant *"Multi-field Compliant Mechanisms of Adaptive Foldable Structures"* (FA9551-14-1-0234), co-PI (PI: A. Muliana, co-PIs: K. Rajagopal and W. Schneider), *$599,630*, September 2014 - August 2017.

[6] National Science Foundation grant *"CAREER: Explicit Adaptive Methods for Coupled Problems"* (DMS-1254618), PI, Single investigator CAREER award, *$405,412*, 2013-2018.

[5] Innovation award through grant (KUS-C1-016-04) made by King Abdulla University of Science and Technology (KAUST), PI, *$25,000 + $15,000 (travel)*, 2013-2014.

[4] Office of Naval Research grant *"Numerical Methods for Solving Parametric PDEs"* (N000141110712). CoPI (PI: R.A. DeVore, CoPI: G. Petrova), *$407,183*, 2011-2015.

[3] King Abdullah University of Science and Technology Global Research Partnership Center "Institute for Applied Mathematics and Computer Science" (KUS-C1-016-04). Member since 2011. Total funding *$25,000,000*, 2008-2013.

[2] National Science Foundation grant *"Space and Time Adaptivity for Moving and Free Boundary Problems"* (DMS-0914977). PI - Single Investigator Grant, *$137,096*, 2009-2013.

[1] Innovation award through grant (KUS-C1-016-04) made by King Abdulla University of Science and Technology (KAUST), investigator (PI: J.R. Walton), *$20,000*, 2008-2009.

Awards & Fellowships

Recipient of the NSF CAREER award.

[3] Department award for Outsdanding Service, 2020.

[2] National Science Foundation CAREER award, 2013.

[1] Postdoc fellowship awarded by the Swiss National Science Foundation (PBEL2–114311), 2006.

Books

[2] Bonito, A. and Nochetto, R.H. (eds), Handbook of Numerical Analysis, vol. XXII: Geometric Partial Differential Equations - Part II. 544p. Elsevier/North-Holland, Amsterdam, 2021.

[1] Bonito, A. and Nochetto, R.H. (eds), Handbook of Numerical Analysis, vol. XXI: Geometric Partial Differential Equations - Part I. 692p. Elsevier/North-Holland, Amsterdam, 2020.

Book Chapters

[6] Bonito, A. and Demlow, A. and Nochetto, R.H., Finite Element Methods for the Laplace-Beltrami Operator. Handbook of Numerical Analysis, vol. XXI: Geometric Partial Differential Equations - Part I (eds) A. Bonito and R.H. Nochetto, 1–103, 2020.

[5] Bonito, A. and Caboussat, A. and Picasso, *Operator Splitting Algorithms for Free Surface Flows: Application to Extrusion Processes*, in *Scientific Computation*, *677–729*, 2017.

[4] Bonito, A. and Kyza, I. and Nochetto, R.H., A dG Approach to Higher Order ALE Formulations in Time, 2012 Barrett Lectures, The IMA Volumes in Mathematics and its Applications, Vol. 157, 223-258, Springer, 2013.

[3] Bonito, A. and Cascón, J.M and Morin, P. and Nochetto, R.H., *AFEM for Geometric PDE: The Laplace-Beltrami Operator*, Analysis and Numerics of Partial Differential Equations. In memory of Enrico Magenes, Springer INdAM Series, eds U. Gianazza and F. Brezzi and P.C. Franzone and G. Gilardi, Vol. 4, 257–306, 2013.

[2] Bonito, A. and Clément, Ph. and Picasso, M., *Viscoelastic flows with complex free surfaces: Numerical analysis and simulations*, Handbook of numerical analysis, eds P.G. Ciarlet, vol. XVI: Numerical Methods for Non-Newtonian Fluids, *305–370*, 2011.

[1] Bonito, A. and Caboussat, A. and Picasso, M. and Rappaz, J., *A numerical method for fluid flows with complex free surfaces*, Partial Differential Equations, Comput. Methods Appl. Sci. (16), *187–208*, 2008. Edited by R. Glowinski and P. Neittaanmäki, Springer.

Referred Journal Publications

A complete list of publication including submitted manuscripts is available on my website.

[58] Binev, P. and Bonito, A. and DeVore, R. and Petrova, G., *Optimal Learning*, Calcolo, to appear, 2023.

[57] Bonito, A. and Guignard, D. and Morvant, A., *Numerical approximations of thin structure deformations*, Comptes Rendus. Mécaniques, 351(1), 1–37, 2023.

[56] Bartels, S. and Bonito, A. and Tscherner, Ph., *Error estimates for a linear folding model*, IMA Journal of Numerical Analysis, to appear, 2023.

[55] Bartels, S. and Bonito, A. and Hornung, P., *Modeling and simulation of thin sheet folding*, Interfaces and Free Boundaries, 24(4), 459–485, 2022.

[54] Bonito, A. and Lei, W., *Approximation of the spectral fractional powers of the Laplace-Beltrami Operator*, Numerical Mathematics: Theory, Methods and Applications, 15(4), 1193–1218, 2022.

[53] Bonito, A. and Guignard, D. and Nochetto, R.H. and Yang, Sh., *Numerical analysis of the LdG method for large deformations of prestrained plates*, IMA: J. Numer. Anal., to appear, 2023.

[52] Bonito, A. and Guignard, D. and Nochetto, R.H. and Yang, Sh., *LdG Approximation of Large Deformations of Prestrained Plates*, J. Comput. Phys., 448, 2022.

[51] Bonito, A. and Guignard, D. and Girault, V. and Süli, E., *Finite Element Approximation of Steady Flows of Colloidal Solutions*, ESAIM: M2AN, 55(5), 1963–2011, 2021.

[50] Bonito, A. and Nazarov, M., *Numerical Simulations of Surface-Quasi Geostrophic Flows on Periodic Domains*, SIAM Journal on Scientific Computing, 43(2), B405–B430, 2021.

[49] Bonito, A. and Nochetto, R.H. and Ntogkas, D., *DG Approach to Large Bending Plate Deformations with Isometry Constraint*,M3AS, 31(1), 133–175, 2021.

[48] Bonito, A. and Cohen, A. and DeVore, R. and Guignard, D. and Jantsch, P. and Petrova, G., *Nonlinear Methods for Model Reduction*, ESAIM:M2AN, 55, 507–531, 2021.

[47] Bonito, A. and DeVore, R. and Guignard, D. and Jantsch, P. and Petrova, G., *Polynomial Approximation of Anisotropic Analytic Functions of Several Variables*, Constructive Approximation, 53, 319–348, 2021.

[46] Bonito, A. and Nochetto, R.H. and Ntogkas, D., *Discontinuous Galerkin Approach to Large Bending Deformation of a Bilayer Plate with Isometry Constraint*, J. Comput. Phys., 423, 2020.

[45] Bonito, A. and Demlow, A. and Licht, M., *A divergence-conforming finite element method for the surface Stokes equation.* SIAM J. Numer. Anal., 2020.

[44] Bonito, A. and Guignard, D. and Zhang, A., *Reduced basis approximations of the solutions to fractional diffusion problems.* J. Numer. Math, 28(3), 147–160, 2020.

[43] Bonito, A. and Wei, P., *Electroconvection of Thin Liquid Crystals: Model Reduction and Numerical Simulations.* J. Comput. Phys., 405, 2020.

[42] Bonito, A. and Lei, W. and Salgado, A., *Finite element approximation of an obstacle problem for a class of integro–differential operators.* ESAIM:M2AN, 54(1), 229–253, 2020.

[41] Bonito, A. and Girault, V. and Süli, E., *Finite Element Approximation of a Strain-Limiting Elastic Model*, IMA J. Numer. Anal., 40(1), 29–86, 2020.

[40] Bonito, A. and Demlow, A., *A posteriori error estimates for the Laplace-Beltrami operator on parametric C^2 surfaces.* SIAM J. Numer. Anal., 57(3), 973–996, 2019.

[39] Bonito, A. and Lei, W. and Pasciak, J.E., *Numerical Approximation of the Integral Fractional Laplacian.* Numer. Math., 142(2), 235–278, 2019.

[38] Berrone, S. and Bonito, A. and Stevenson R. and Verani M., *An optimal adaptive Fictitious Domain Method*, Math. Comp., 88, 2101–2134, 2019.

[37] Bonito, A. and Lei, W. and Pasciak, J.E., *On Sinc Quadrature Approximations of Fractional Powers of Regularly Accretive Operators.* J. Numer. Math, 27(2), 57–68, 2019.

[36] Bonito, A. and Demlow, A. and Owen, J., *A Priori error estimates for finite element approximations to eigenvalues and eigenfunctions of the Laplace-Beltrami operator.* SIAM J. Numer. Anal., 56(5), 2963–2988, 2018.

[35] Bartels, S. and Bonito, A. and Muliana, A. and Nochetto, R.H., *Modeling and simulation of thermally actuated bilayer plates.* J. Comput. Phys., 354, 512–528, 2018.

[34] Bonito, A. and Borthagaray, J.P. and Nochetto, R.H. and Otárola, E. and Salgado, A.J., *Numerical Methods for Fractional Diffusion*. Comput. Vis. Sci., 19(5), 19–46, 2018.

[33] Bonito, A. and Lei, W. and Pasciak, J.E., *Numerical Approximation of space-time fractional parabolic equations*. Comput. Methods Appl. Math., 17(4), 679–705, 2017.

[32] Bonito, A. and Cohen, A. and DeVore, R. and Petrova, G. and Welper, G., *Diffusion Coefficients Estimation for Elliptic Partial Differential Equations*, SIAM J. Math. Anal., 49(2), 1570–1592, 2017.

[31] Bonito, A. and Lei, W. and Pasciak, J.E., *The Approximation of Parabolic Equations Involving Fractional Powers of Elliptic Operators*, J. Comput. Appl. Math., 315, 32–48, 2017.

[30] Bonito, A. and Pasciak J.E., *Numerical Approximation of Fractional Powers of Regularly Accretive Operators*, IMA J. Numer. Anal., 37(3), 1245–1273, 2017.

[29] Bartels, S. and Bonito, A. and Nochetto, R.H., *Bilayer Plates: Model Reduction,* Γ*-convergent Finite Element Approximation and Discrete Gradient Flow*, Comm. Pure Appl. Math., 70(3), 547–589, 2017.

[28] Bonito, A. and Cascón, K. Mekchay, J.M and Morin, P. and Nochetto, R.H., *Higher-Order AFEM for the Laplace-Beltrami operator: Convergence rates*, Found. Comput. Math., 16(6), 1473–1539, 2016.

[27] Bonito, A. and Demlow A., *Convergence and optimality of higher-order adaptive finite element methods for eigenvalue clusters*, SIAM J. Numer. Anal., 54(4), 2379–2388, 2016.

[26] Bonito, A. and Guermond, J.-L and Luddens, F., *An Interior Penalty Method with* C^0 *Finite Elements for the Approximation of the Maxwell Equations in Heterogeneous Media: Convergence Analysis with Minimal Regularity*, Math. Model. Numer. Anal., 50(5), 1457–1489, 2016

[25] Bonito, A. and Guermond, J.-L. and Lee, S., *Numerical Simulations of Bouncing Jets*, Internat. J. Numer. Methods Fluids, 80(1), 53–75, 2015.

[24] Bonito, A. and Pasciak, J.E., *Numerical Approximation of Fractional Powers of Elliptic Operators*, Math. Comp., 84 (295), 2137–2162, 2015.

[23] Bonito, A. and Devaud, D., *Adaptive Finite Element Methods for the Stokes Problems with Discontinuous Coefficients*, Math. Comp., 84 (295), 2083–2110, 2015.

[22] Bonito, A. and Glowinski, R., *On the Nodal Set of the Eigenfunctions of the Laplace-Beltrami Operator for Bounded Surfaces in* $\mathbb{R}^3$*: A Computational Approach*, Commun. Pure Appl. Anal., 13(5), 2115–2126, 2014.

[21] Bonito, A. and Guermond, J.-L. and Popov, B., *Stability Analysis of Explicit Entropy Viscosity Methods for Non-Linear Scalar Conservation Equations*, Math. Comp., 83(287), 2014.

[20] Bonito, A. and DeVore, R.A. and Nochetto, R.H.,*Adaptive Finite Element Methods for Elliptic Problems with Discontinuous Coefficients*, SIAM J. Numer. Anal., 51(6), 3106–3134, 2013.

[19] Bonito, A. and Guermond, J.-L and Luddens, F., *Regularity of the Maxwell equations in heterogeneous media and Lipschitz domains*, J. Math. Anal. Appl., 408(2), 498–512, 2013.

[18] Lee, S. and Li, E.Q. and Marston, J.O. and Bonito, A. and Thoroddsen, S.T., Physical Review E. (Rapid Communication), 87(6), 4 pages, 2013.

[17] Bonito, A. and Kyza, I. and Nochetto, R.H., *Time-discrete higher order ALE formulations: Stability*, SIAM J. Numer. Anal., 51(1), 577–604, 2013.

[16] Bonito, A. and Kyza, I. and Nochetto, R.H., *Time-discrete higher order ALE formulations: A Priori error analysis*, Numer. Math., 125(2), 225–257, 2013.

[15] Srinivasan, Sh. and Bonito, A. and Rajagopal, K.R., *Flow of a fluid through a porous solid due to high pressure gradients*, Journal of Porous Media, 16(3), *193–203*, 2013.

[14] Bonito, A. and Pasciak J.E., *Variational and non-Variation Multigrid Algorithms for the Laplace-Beltrami Operator*, Math. Comp., 81(279), *1263–1288*, 2012.

[13] Bonito, A. and Nochetto, R.H. and Pauletti, M.S., *Dynamics of Biomembranes: Effect of the Bulk Fluid*, Math. Model. Nat. Phenom., 6(5), *25–43*, 2011.

[12] Bonito, A. and Guermond, J.-L., *Approximation of the Eigenvalue Problem for Time Harmonic Maxwell System by Continuous Lagrange Finite Elements*, Math. Comp., 80(276), *1887–1910*, 2011.

[11] Bonito, A. and Nochetto, R.H. and Pauletti, M.S., *Geometrically Consistent Mesh Modification*, SIAM J. Numer. Anal., 48(5), *1877–1899*, 2010.

[10] Bonito, A. and Nochetto, R.H., *Quasi-Optimal convergence rate of an interior penalty adaptive discontinuous Galerkin method*, SIAM J. Numer. Anal., 48(2), *734–771*, 2010.

[9] Walker, S.W. and Bonito, A. and Nochetto, R.H., *Mixed Finite Element Method for Electrowetting On Dielectric with Contact Line Pinning*, Interface Free Bound, 12(1), *85–119*, 2010.

[8] Bonito, A. and Nochetto, R.H. and Pauletti, M.S., *Parametric FEM for Geometric Biomembranes*, J. Comput. Phys., 229, *3171–3188*, 2010.

[7] Bonito, A. and Lozinski, A. and Mountford, Th., *Modeling Viscoelastic Flows using Reflected Stochastic Differential Equations*, Commun. Math. Sci., 8(3), *655–670*, 2010.

[6] Bonito, A. and Nochetto, R.H. and Quah, J. and Margetis, D., *Towards self-organization of decaying surface corrugations: A numerical study*, Phys. Rev. Lett. E., 79(5), *4 pages*, 2009.

[5] Bonito, A. and Burman, E., *A continuous interior penalty method for viscoelastic flows*, SIAM J. Sci.Comput., 30(3), *1156–1177*, 2008.

[4] Bonito, A. and Clément, Ph. and Picasso, M., *Mathematical and numerical analysis of a simplified time-dependent viscoelastic flow*, Numer. Math., 107(2), *213-255*, 2007.

[3] Bonito, A. and Clément, Ph. and Picasso, M., *Finite element analysis of a simplified stochastic Hookean dumbbells model arising from viscoelastic flows*, Math. Model. Numer. Anal., 40(4), *785–814*, 2006.

[2] Bonito, A. and Clément, Ph. and Picasso, M., *Mathematical analysis of a stochastic simplified Hookean dumbbells model arising from viscoelastic flow*, J. Evol. Equ., 6(3), *381–398*, 2006.

[1] Bonito, A. and Picasso, M. and Laso, M., *Numerical simulation of 3D viscoelastic flows with free surfaces*, J. Comput. Phys., 215(2), *691–716*, 2006.

Referred Proceedings

[4] Berrone, S. and Bonito, A. and Verani, M., *An Adaptive Fictitious Domain Method for elliptic problems*, ECCOMAS 2015 - SEMA SIMAI special issue, 12, 229–244, 2016.

[3] Bonito, A. and Guermond, J.-L. and Lee, S., *Modified Pressure-Correction Projection Methods: Open Boundary and Variable Time Stepping*, Numerical Mathematics and Advanced Applications - ENUMATH 2013, Lecture Notes in Computational Science and Engineering, 103, 623–631, 2015.

[2] Bonito, A. and Pasciak J.E., *A multigrid algorithm for an elliptic problem with a perturbed boundary condition*, Numerical Solution of Partial Differential Equations: Theory, Algorithms and their Applications - In honor of Professor Raytcho Lazarov's 40 Years Research in Computational Methods and Applied Mathematics. Eds L.T. Zikatanov, 45, 69–79, 2013, Springer.

[1] Bonito, A. and Burman, E., *A face penalty method for the three fields Stokes equation arising from Oldroyd-B viscoelastic flows*, Numerical mathematics and advanced applications, *487–494*, 2006. Edited by A. Bermúdez de Castro, D. Gómez, P. Quintela and P. Salgado, Refereed proceedings of the 6th European Conference (ENUMATH 2005), Springer.

Softwares

[2] Bonito, A. and Guignard, D., *Solving the fourth-order biharmonic equation using a lifting operator approach*, Tutorial Step-82 in the deal.ii library.

[1] Bonito, A. and Pauletti S., *Solving the Laplace-Beltrami equation on curved manifolds embedded in higher dimensional spaces*, Tutorial Step-38 in the deal.ii library.

Research Invitations

[11] June 29 - July 1, 2017, Workshop on *"Recent Advances and Challenges in Discontinuous Galerkin Methods and Related Approaches"*, Institute for Mathematics and its Applications, Minnesota, USA.

[10] Jul. 13-24, 2015, Workshop on *"Coupling Geometric PDEs with Physics for Cell Morphology"*, Isaac Newton Institute, Cambridge, United Kindom.

[9] Nov. 14-18, 2011, Workshop on *"Free Boundary Problems Arising in Biology"*, The Mathematical Bioscience Institute, The Ohio State University, Columbus, Ohio.

[8] May 16-21, 2011, Department of Mathematics, University of Maryland, College Park, Maryland.

[7] March 14-19, 2011, Department of Mathematics, University of Maryland, College Park, Maryland.

[6] *Numerical Solution of Partial Differential Equations: Fast Solution Techniques*, Nov. 28 - Dec. 3, 2010, IMA, Minneapolis, Minnesota.

[5] August 3-7, 2010, Department of Mathematics, University of Maryland, College Park, Maryland.

[4] July 5-16, 2010, Department of Mathematics, Laboratory for Modeling and Scientific Computing (MOX), Milan, Italy.

[3] May 27 - June 25, 2010, Department of Mathematics, EPFL, Lausanne, Switzerland.

[2] July 13 - July 19, 2009, Université Pierre et Marie Curie, Paris VI, France.

[1] June 20 - June 25, 2005, Delft University of Technology, Netherlands.

Participation to Conferences and Invited Seminars

[86] *Applied Mathematics Undergraduate SEminar (AMUSE)*, Department of Mathematics, Texas A&M University, Sept. 13, 2023, TX, USA.

[85] *Foundation of Computational Mathematics*, Workshop on "Multiresolution and Adaptivity in Numerical PDEs", June 12-14, 2023, Paris, France.

[84] *CAMDA inaugural workshop*, special session on "Contemporary Optimal Recovery", Department of Mathematics, Texas A&M University , May 22-25, 2023, TX, USA.

[83] *Colloquium*, Department of Mathematics, University of Houston, April 26, 2023, TX, USA.

[82] *Taming Complexity in Partial Differential Systems*, 2nd SFB international Workshop, April 19-21, 2023, University of Vienna, Austria.

[81] *Finite Element Rodeo*, March 24-25, 2023, Texas A&M, TX, USA.

[80] *Joint Mathematics Meetings*, special session on "Mathematical Methods in Machine Learning", Jan 4-5, 2023, Boston, USA.

[79] *Joint Mathematics Meetings*, semi-plenary talk in the special session on "Recent Developments in Numerical Methods for PDEs", Jan 4, 2023, Boston, USA.

[78] *CMAI Colloquium*, Dec 2, 2022. George Mason University, Washington D.C., USA.

[77] *SIAM-TXLA*, mini-workshop on "Modeling, analysis and numerical simulations involving thin structures". November 4-6, 2022, University of Houston, TX, USA.

[76] *Applied Mathematics and Inverse Problems seminar*, Oct. 13, 2012, Colorado State University, Colorado, USA.

[75] *SIAM Annual meeting*, mini-symposium on "Nonlinear Viscous Flow", Jul. 12-14, 2022, Pittsburgh, Pennsylvania, USA.

[74] *Numerical Analysis Seminar*, Jul. 12, 2022, Department of Mathematics, EPFL, Switzerland.

[73] *Laboratoire de Mathématiques*, Université Bourgogne Franche-Comté, June 28, 2022. Besançon, France.

[72] *Workshop on Nonlinear Bending*, University of Freiburg, May 23–25, 2022. Freiburg, Germany.

[71] *Inverse Problems for Anomalous Diffusion Processes*, Banff International Research Station (BIRS), May 8-13, 2022, Banff, Canada.

[70] *Finite Element Rodeo*, March 4-5, 2022, SMU, TX, USA.

[69] *Computation, Analysis and Applications of PDEs with Nonlocal and Singular Operators* workshop, 3h tutorial on fractional diffusion. February 25, 2022. National University of Singapore, Singapore. Online.

[68] *SIAM-TXLA*, mini-workshop on "Numerical methods for problems with interfaces and surface PDEs". November 5-7, 2021, South Padre Island, TX, USA.

[67] *International Conference on Free Boundary Problems: Theory and Applications*, mini-symposium on "Numerical Methods on Geometric PDEs", Sept. 13-18, 2021, Online.

[66] *SIAM annual meeting*, mini-symposium on "Nonlocal Problems in Analysis and Numerics", July 18-23, 2021, Online.

[65] *Colloqium*, March 30, 2021. The Hong Kong Polytechnic University. Hong Kong. Online.

[64] *Recent Progress in Nonlocal Modeling, Analysis, and Computation*, June 14-18, 2020. Online.

[63] *Center for Computational & Applied Mathematics Seminar*, April 15, 2019, Purdue University.

[62] *SIAM-TXLA*, mini-workshop on "Geometric PDEs", October 5-7, 2018, Louisiana state university, USA.

[61] *ICERM*, workshop on "Fractional PDEs: Theory, Algorithms and Applications", June 18-22, 2018, Brown university, USA.

[60] *Laboratoire Jacques-Louis Lions seminar*, June 8, 2018, Univeristé Pierre et Marie Curie, Sorbonne, Paris 6, France.

[59] *Workshop on Modeling, Analysis and Numerics for Nonlocal Applications*, Dec 11-15, 2017, Santa Fe, New Mexico.

[58] *Foundation of Computational Mathematics*, Workshop on "Multiresolution and Adaptivity in Numerical PDEs", July 13-16, 2017, Barcelona, Spain.

[57] *Mathematisches Forschungsinstitut Oberwolfach*, workshop on "Multiscale and High-Dimensional Problems", March 27-31, 2017, Oberwolfach, Germany.

[56] *Mathematisches Forschungsinstitut Oberwolfach*, workshop on "Space-time Methods for Time-dependent Partial Differential Equations", March 13-18, 2017, Oberwolfach, Germany.

[55] *Workshop on Applied and Computational Mathematics*, in occasion of Roland Glowinski's 80th birthday, March 9, 2017, Department of Mathematics, University of Houston, TX, USA.

[54] *Applied Math Seminar*, November 6-8, 2016, Department of Mathematics, South Carolina University, USA.

[53] *Colloquium*, July 11, 2016, Department of Mathematics, University of Heidelberg, Germany.

[52] *Mathematics of Finite Elements and its Applications (MAFELAP)*, Mini Workshop on "PDE Eigenvalue Problems: Computational Modeling and Numerical Analysis", June 14-17, 2016, Brunel University, United Kingdom.

[51] *Mathematics of Finite Elements and its Applications (MAFELAP)*, Mini Workshop on "Adaptive Methods and Singular Solutions of Nonlinear Problems", June 14-17, 2016, Brunel University, United Kingdom.

[50] *Mathematics of Finite Elements and its Applications (MAFELAP)*, Mini Workshop on "Numerical Methods for Fourth Order Problems", June 14-17, 2016, Brunel University, United Kingdom.

[49] *Numerical Analysis Seminar*, May 18, 2016, Department of Mathematics, EPFL, Switzerland.

[48] *Applied Math. Seminar*, February 26, 2016, Department of Mathematics, Rutgers University, NJ, USA.

[47] *Joint Mathematics Meetings*, AMS special session on "Problems in Geometry and Design Material", January 6-7, 2016, Seattle, USA.

[46] *Numerical Analysis Seminar*, July 9, 2015, Department of Mathematics, EPFL, Switzerland.

[45] *Finite Element Rodeo*, February 28-29, 2015, SMU, Dallas.

[44] *Foundation of Computational Mathematics*, Mini Workshop on the Foundations of Numerical PDEs, December 18-20, 2014, Montevideo, Uruguay.

[43] *Numerical Analysis Seminar*, November 13, 2014, Department of Mathematics, University of Delaware, DE, USA.

[42] *Méthodes Numériques (seminar)*, June 29, 2014, Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie.

[41] *Colloquium*, February 5, 2014, Department of Mathematics, University of Geneva, Switzerland.

[40] *Flow, Geometric Motion, Deformation, and Mass Transport in Physiological Processes*, IMA Summer Graduate Program, Guest lecturer (two lectures), July 15 - August 2, 2013, University of Minnesota, MN, USA.

[39] *Numerical Analysis Seminar*, May 14, 2013, Department of Mathematics, University of Maryland, MD, USA.

[38] *Numerical Approximation of PDEs: Adaptivity, Error Control and Convergence*, in occasion of R.H. Nochetto 60th birthday, March 20-23, 2013, Gargnano del Garda, Italy.

[37] *Finite Element Rodeo*, March 2-3, 2012, Rice University, Texas.

[36] *Mathematisches Forschungsinstitut Oberwolfach*, workshop on "Geometric PDEs: Theory, Numerics, and Applications", Nov. 28 - Dec. 2, 2011, Oberwolfach, Germany.

[35] *Center for Computation & Technology Seminar*, August 23, 2011, LSU, Baton Rouge, Louisiana.

[34] *ICIAM*, mini-wirkshop on "Discontinuous Galerkin Methods for Partial Differential Equations", July 18-22, 2011, Vancouver, Canada.

[33] *ICIAM*, mini-wirkshop on "A Posteriori Error Control and Adaptivity for Nonlinear and Evolutive Problems", July 18-22, 2011, Vancouver, Canada.

[32] *Reliable Methods of Mathematical Modeling*, July 6-8, 2011, EPFL, Switzerland.

[31] *Numerical Analysis Seminar*, May 25, 2011, Department of Mathematics, EPFL, Switzerland.

[30] *AMS Western Section Meeting*, Apr 30 - May 1, 2011, mini-workshop "Fluid-structure interactions", Las Vegas, NV, USA.

[29] *Applied Math. Seminar*, Apr 4, 2011, Department of Mathematics, University of Minnesota, MN, USA.

[28] *Nonstandard Discretizations for Fluid Flows*, Banff International Research Station (BIRS), Nov 21-26, 2010, Banff, Canada.

[27] *Computational Mathematics in Science and Engineering: Theory, algorithms, applications*, Sept. 1. EPFL, 2010, Switzerland.

[26] *Numerical Analysis Seminar*, June 16, 2010, Department of Mathematics, EPFL, Switzerland.

[25] *Adaptive and Multilevel Methods for Partial Differential Equations.* Nov 13-14, 2009. Workshop in honor of Randolph Bank's 60th Birthday. University of California San Diego in La Jolla, California, USA.

[24] *Numerical Analysis Seminar*, Nov 3, 2009, Department of Mathematics, University of Maryland, MD, USA.

[23] *Numerical Analysis Seminar*, Oct 29, 2009, Department of Mathematics, University of Houston, TX, USA.

[22] *ENUMATH*, mini-workshop "Adaptive Finite Element Methods for Nonlinear Problems" .June 29 - July 3, 2009, Uppsala, Sweden.

[21] *ECCOMAS: Coupled Problems*, June 8-11, 2009, Ischia, Italy.

[20] *Finite Element Rodeo*, Feb. 27-28, 2009, University of Texas, Austin, TX, USA.

[19] *Colloquium*, Feb 12, 2008, Department of Mathematics, Texas A&M University, USA.

[18] *Colloquium*, Feb 1, 2008, Department of Mathematics, Penn. State University, PA, USA.

[17] *Joint Research Symposium on Fluid Dynamics*, May 2, 2008, University of Maryland, MD, USA.

[16] *Adaptive numerical methods for PDE's*, Jan 21-25, 2008, Wolfgang Pauli Institute in Vienna, Austria.

[15] *Numerical Analysis Seminar*, Jan 11, 2008, Department of Mathematics, EPFL, Switzerland.

[14] *Numerical Analysis Seminar*, Oct 10, 2007, Department of Mathematics, Texas A&M, TX, USA.

[13] *International Congress on Industrial and Applied Mathematics*, July 16-20, 2007, ETHZ, Switzerland.

[12] *Numerical Analysis Seminar*, July 15, 2007, Department of Mathematics, EPFL, Switzerland.

[11] *Numerical Methods for Nonlinear Elliptic Equations*, May 21-25, 2007, University of Iowa, IA, USA.

[10] *Finite Element Circus*, April 20-21, 2007, University of Maryland, MD, USA.

[9] *Numerical Analysis Seminar*, Nov 30, 2006, Department of Mathematics, University of Houston, TX, USA.

[8] *Finite Element Circus*, November 3-4, 2006, Penn State University, PA, USA.

[7] *Numerical Analysis Seminar*, Sept 26, 2006, Department of Mathematics, University of Maryland, MD, USA.

[6] *European Finite Element Fair 4*, June 2-3, 2006, ETH Zürich, Switzerland.

[5] *Journée d'automne de la Société Mathematique Suisse*, September 22-24, 2005, Lugano, Switzerland.

[4] *ENUMATH*, July 18-22, 2005, Santiago de Compostela, Spain.

[3] *SMAI: 2ème congrès national de mathématiques appliquées et industrielles*, May 23-27, 2005, Evian, France.

[2] *Colloquium Numérique Suisse*, March 24, 2005, University of Zürich, Switzerland.

[1] *Modèles rhéologiques multiéchelles pour les fluides*, November 14-17, 2004, Montréal, Canada.

Teaching

7 different undergraduate classes, 9 different graduate classes for a total exceeding 700 students.

MATH 151: Engineering Mathematics I (undergraduate)

Fall 2022 (50 students).

MATH 308: Differential Equations (undergraduate)

Fall 2013 (47 students), Spring 2013 (55 students), Spring 2012 (2 sections for a total of 114 students), Spring 2011 (43 students), Spring 2009 (2 sections for a total of 106 students), Spring 2015 (55 students), Spring 2019 (56 students).

MATH 308H: Differential Equations Honors (undergraduate)

Spring 2014 (17 students), Spring 2019 (26 students).

MATH 412: Theory of PDEs (undergraduate)

Fall 2016 (18 students + 5 honors).

MATH 417: Numerical Methods (undergraduate)

Spring 2018 (40 students), Spring 2016 (2 sections for a total of 60 students).

MATH-601: Methods of Applied Mathematics I (graduate)

Spring 2010 (40 students).

MATH-603: Methods of Applied Mathematics II (graduate)

Fall 2009 (7 students).

MATH 609d: Numerical Analysis (distance, graduate)

Fall 2019 (8 students), Fall 2018 (9 students), Fall 2017 (8 students), Fall 2016 (10 students).

MATH 610: Numerical Methods for Partial Differential Equations (graduate)

Spring 2022 (7 students), Spring 2018 (13 students), Fall 2011 (6 students), Spring 2014 (10 students).

MATH 611: Introduction to Ordinary Differential Equations and Partial Differential Equations (graduate)

Fall 2012 (14 students).

MATH 612: Partial Differential Equations (graduate)

Spring 2013 (15 students).

MATH-664: Special Topic Class - Foundations of Adaptive Finite Element Methods

and their Implementation (graduate).

Fall 2010 (6 students).

MATH-664: Special Topic Class - Geometric PDEs and Their Approximations (graduate).

Spring 2015 (11 students).

MATH-679: Mathematical Algorithms and Their Implementations (graduate).

Fall 2020 (21 students), Spring 2023 (8 students).

Linear Algebra and Differential Equations at UMD (honors undergraduate)

Spring 2008 (11 students), Spring 2007 (28 students).

Multivariables Calculus at UMD (honors undergraduate)

Fall 2007 (25 students).

Mentoring

1 Postdoc, 4 Ph.D students, 6 Master students and 3 Undergraduate students

Postdoc

D. Guignard, 2017-2020. First job as assistant professor at U. Ottawa.

Ph.D students

S. Lee, *Numerical Simulation for Bouncing Jets*, 2014. Visiting assistant professor at the UT-Austin after graduation. Now tenure track faculty at FSU.

S. Patty, *An energy formulation of surface tension or Willmore force for two-phase flow*, 2017. Software engineer at Intel corporation after graduation.

W. Lei, *Numerical methods for fractional operators*, 2018. Postdoctoral fellow at SISSA, IT. Now assistant professor at UESTC, China.

P. Wei, *Numerical approximation of time dependent fractional diffusion with drift: applications to surface quasi-geostrophic dynamics and electroconvection*, 2019. Research scientist at GEIRINA after graduation. Now software engineer at Amazon.

Master students

D. Devaud, *Adaptive Methods for the Stokes System with Discontinuous Viscosities.* Exchange student (local institution: EPFL), 2013. PhD candidate at ETH Zurich in Switzerland after exchange, now scientific researcher at the Swiss federal administration.

D. Paulo, *Asynchronous parallel methods in time*, 2016. Army's Infantry Basic Officer Leaders academy after graduation.

E. Pierce, *Convex Optimization Using the Nesterov Accelerated Gradient Algorithm* (distance), 2019.

Y. Leon, *The Fractional Laplacian* (distance), 2020.

J. Berg, *Non conforming approximations of linear plates* (distance), 2020.

M. Wang, *Metric Traveling Salesman*, 2021.

Graduate Summer Directed Study

R. Zhang, *Numerical methods for high dimensional problems* (2018); J. Hu, *Fractional Diffusion of non-symmetric operators* (2017); W. Baines, *Free rigid motions in plates* (2017); D. Paulo, *Implementation of the Parareal Algorithm within deal.ii*; Y. Xu, *The Parareal Algorithm* (2012); D.C. Quiroz, *Numerical Approximation of the Eigenvalues of the Laplace-Beltrami Operator* (2011); R. Yang, *Numerical Simulation of Diffusion Processes on Surfaces* (2010); S. Lee, *The Oldroyd-B Model* (2010).

Undergraduate students

S. Thomson and L. Trevino, *Numerical methods for high dimensional problems* (2018); S. Capps, *Fractional Diffusion using Stochastic ODEs* (2016);

Synergistic Activities and Services

Departmental services

Co-organizer of the Numerical Analysis seminar (since 2022);

Founder and organizer of the Ewing Lecture series (since 2019);

Member of the Speaker Committee (since 2019);

Member of the Executive Committee (2013 - 2015, 2018-2020);

Chair of the Graduate Committee (2019 - 2022);

Member of the sub-committee P (2017 to 2019, chair in 2019);

Member of the Award Committee (2017 to 2019);

Member of the Undergraduate Committee (2015 to 2017);

Member of the IT Security Committee (2016 to 2018);

Grader for annual math contest (2011);

Presentations to prospective students (2009, 2010), in the undergraduate seminar (2010), in the Research Experience for Undergraduates summer school (2013), in the graduate seminar (2010, 2013).

University services

Member of the search committee for the College of Arts and Sciences Dean (2023);

Member of the search committee for the College of Science Director of IT (2020-2021);

Member of the MS Data Science admission committee (2020 - 2022);

Member of the MS Data Science curriculum committee (2020 - 2022);

Member of the Dean's IT Task Force for the College of Science (2016 and 2017);

TAMU Diversity fellowships Reviewer (2016);

Pathway judge (2011) & Judge during the student research week (2014);

Member of the Texas A&M faculty senate (2009 - 2010 and 2012-2013);

Community Services

Conferences, Workshops and Mini-Symposiums

Frontiers of Numerical PDEs in the occasion of R.H. Nochetto's 70th birthday. May 16-19, 2023, University of Maryland, MD, USA. Co-organizer, member of the scientific committee;

Fifth Annual Meeting of the SIAM TX-LA section, November 4-6, 2022, University of Houston, TX, USA. Member of the organizing committee;

SIAM-TXLA, mini-workshop on "Recent Advances in Learning", November 4-6, 2022, University of Houston, TX, USA. Co-organizer;

SIAM-TXLA, mini-workshop on "Modeling, analysis and numerical simulations involving thin structures", November 4-6, 2022, University of Houston, TX, USA. Co-organizer;

Fourth Annual Meeting of the SIAM TX-LA section, November 5-7, 2021, South Padre Island, TX, USA. Member of the organizing committee;

SIAM-TXLA, mini-workshop on "Numerical methods for problems with interfaces and surface PDEs", November 5-7, 2021, South Padre Island, TX, USA. Co-organizer;

Third Annual Meeting of the SIAM TX-LA section, October 16-18, 2020, Texas A&M University (online), TX, USA. Lead organizer (550 participants). SIAM News Blog written by S. Shipman;

SIAM-TXLA, mini-workshop on "Recent advances in the approximation of geometric partial differential equations", October 16-18, 2020, Texas A&M University (online). Co-organizer;

Second Annual Meeting of the SIAM TX-LA section, November 1-3, 2019, Southern Methodist University, Dallas, TX, USA. Member of the organizing committee;

Numerical Methods for Geometric PDEs: mini-symposium at ICIAM, July 15-19, 2019. Valencia, Spain. Co-organizer;

Numerical Methods for Fractional Differential Equations: mini-symposium at the SIAM Texas-Louisiana section, October 5-7, 2018. Louisiana state university, USA, co-organizer with Robert Lipton;

Geometric PDEs and Their Approximations: Winter school for graduate students (50 students, 12 lectures, 8 lab sessions), January 10-16, 2016. Texas A&M, USA, co-Lecturer (with R.H. Nochetto) and main organizer;

Computational Fluid Dynamics at TAMU: April 8-10, 2015. Texas A&M, USA, co-Organizer;

Maxwell and Magneto-Hydrodynamics: Mini-symposium part of ENUMATH, August 26-30, 2013. EPFL, Switzerland. Organizer;

Geometric Partial Differential Equations: Mini-symposium part of ENUMATH, August 26-30, 2013. EPFL, Switzerland. Organizer;

Numerical Approximation of PDEs: Adaptivity, Error Control and Convergence: March 20-22, 2013. Palazzo Feltrinelli, Gargnano del Guarda, Italy. Organizer;

Numerical Methods in PDEs: January 25-26, 2013. Texas A&M University, USA. Organizer (chair).

Finite Element Rodeo: February 25-26, 2011. Texas A&M, USA. Organizer (chair, 40 talks and 76 participants);

Complex Fluid Dynamics: March 22-25, 2010. KAUST, SA. Organizer (chair, 17 plenary talks); SIAM news "Impression of KAUST" by A. Quarteroni, June 22, 2010. SMAI bulletin "Petit cours sur KAUST" by O. Pironneau, MATAPLI (92), 2010.

Research Interaction Team: 2007 & 2008 (UMD), Organizer (chair, 16 talks).

Reviewer Duties

NSF Panels: Frequent participation.

Foreign Science Foundations: Chilean National Science and Techology Commission 2016 and 2021.

Research Journals: About seven papers per year

PhD thesis: Univeristé Pierre et Marie Curie, Paris, France (2013), Ecole polytechnique fédérale de Lausanne, Switzerland (2017), Technische Universität Wien (2021), Université du Luxembourg and Université Bourgogne Franche-Compté (2022)

Editorial Board Member

SIAM Journal of Numerical Analysis, associate editor (since 2020);

Mathematical and Computational Applications, associate editor (since 2020);

Journal of Numerical Mathematics, managing editor (since 2021) and associate editor (2014-2021).