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

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November 13, 2017

Research Interests

Numerical analysis of partial differential equations and scientific computing.

Complex Flows
Deterministic and stochastic viscoelastic flows with free surface.

Geometric Partial Differential Equations
Curvature driven flows, Willmore and Helfrich flows, simulation of biomembranes and crystal surfaces relaxation.

Finite Element Methods
Free boundary problems, optimality of adaptive methods, eigenvalue problems, shock capturing methods for transport equations.

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, master degree in mathematical engineering, 2002.

Grants & Awards

Continuous and complete funding since first year appointment

and recipient of the NSF CAREER award.

[10] 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.

[9] 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.

[8] 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.

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

[6] 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.

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

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

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

[2] 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.

[1] Postdoc fellowship awarded by the Swiss National Science Foundation (PBEL2–114311), *$30,000*, 2006.

Book Chapters

5 refereed book chapters including a contribution in a volume of the Handbook of Numerical Analysis

[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

35 refereed journal publications; most of them in top numerical analysis or scientific computation journals

[35] Bartels, S. and Bonito, A. and Muliana, A. and Nochetto, R.H., *Modeling and simulation of thermally actuated bilayer plates*. To appear in J. Comput. Phys.

[34] Bonito, A. and Borthagaray, J.P. and Nochetto, R.H. and Otárola, E. and Salgado, A.J., *Three Numerical Methods for Fractional Diffusion*. To appear in Comput. Vis. Sci.

[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.

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, Universite Pierre et Marie Curie, Paris VI, France.

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

Participation to Conferences and Invited Seminars

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

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

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

[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. *Invited.*

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

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

[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. *Invited session.*

[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. *Invited session.*

[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. *Invited session.*

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

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

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

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

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

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

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

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

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

[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. *Invited*.

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

[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. *Plenary*.

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

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

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

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

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

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

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

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

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

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

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

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

[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. *Plenary - Invited*.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Professional Experiences

Current Appointment: Professor with Tenure

[2008 -]

Texas A&M University, Department of Mathematics. Professorship position (2015 -); Associate Professorship position (2013 - 2015); Assistant Professorship position (2008 - 2013).

[2006 - 2008]

University of Maryland, Department of Mathematics. Postdoc position in the group of Prof. Ricardo H. Nochetto.

[1999 - 2006]

Ecole Polytechnique Fédérale de Lausanne, Institut d'Analyse et Calcul Scientifique. Research assistant in the group of numerical analysis of Prof. Jacques Rappaz.

[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]

Internship at **Centre Européen de Recherche Nucléaire** (CERN) in Meyrin/Switzerland (Summer 98 and Summer 99).

Teaching

6 different undergraduate classes, 8 different graduate classes for a total of about 500 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).

MATH 308H: Differential Equations Honors (undergraduate)

Spring 2014 (17 students).

MATH 412: Theory of PDEs (undergraduate)

Fall 2016 (18 students + 5 honors).

MATH 417: Numerical Methods (undergraduate)

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 2016 (10 distance students).

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

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).

Linear Algebra and Differential Equations (honors undergraduate UMD)

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

Multivariables Calculus (honors undergraduate UMD)

Fall 2007 (25 students).

Mentoring

3 PhD students, 2 Master students and 1 Undergraduate Student

PhD Adviser

S. Lee, *Numerical Simulation for Bouncing Jets*, 2014. Now assistant professor at FSU.

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

P. Wei, expected to graduate by summer 2019.

Master Adviser

D. Devaud, *Adaptive Methods for the Stokes System with Discontinuous Viscosities.* Exchange student (local institution: EPFL), 2013. Now PhD candidate at ETH Zurich in Switzerland.

D. Paulo, *Asynchronous parallel methods in time*, 2016. Went at the Army's Infantry Basic Officer Leaders academy.

Graduate Summer Directed Study

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 Summer Directed Study

S. Capps, *Fractional Diffusion using Stochastic ODEs* (2016);

Synergistic Activities and Services

Departmental services

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).

Grader for annual math contest (2011).

Member of the Executive Committee (2013 - 2015).

Member of the Undergraduate Committee (2015 to present).

Member of the IT Security Committee (2016 to present).

University services

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

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

TAMU Diversity fellowships Reviewer (2016)

Member of the Dean's IT Task Force for the College of Science (2016 to present).

Workshops and Mini-Symposiums

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).

Panelist

NSF Panel 2010, 2014, 2015 and 2016.

Editorial Board Member

Journal of Numerical Mathematics (since 2014)

Reviewer

About seven papers per year

PhD thesis: Univeristé Pierre et Marie Curie, Paris, France (2013), Ecole polytechnique fédérale de Lausanne, Switzerland (2017)

Research Proposal for the Chilean National Science and Techology Commission 2016.