Anna L. Mazzucato

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EDUCATION

2000 **PhD, Mathematics, University of North Carolina**, Chapel Hill, NC
Dissertation title: *Analysis of the Navier-Stokes and other nonlinear evolution equations with initial data in Besov-type spaces*
Adviser: **Michael E. Taylor**

1994 **Laurea** (BS/MS), **Universitá degli Studi di Milano**, Milan, Italy
Major: **Physics**, GPA: 4.0, graduated with Highest Honors
Research area: Mathematical Physics
Thesis title: *Two-knots, the Tetrahedron equation and Topological Field Theories in 4D* (in Italian)
Adviser: **Paolo Cotta-Ramusino**

EMPLOYMENT

2013-present	**Professor**	**Pennsylvania State University**
2009-2013	**Associate Professor**	**Pennsylvania State University**
2003-2009	**Assistant Professor**	**Pennsylvania State University**
2000-2003	**Gibbs Instructor**	**Yale University** (on-leave 2001-2002)
Jan-June 2002	**Post-doctorate Fellow**	**Institute for Mathematics and its Applications**
Aug-Dec 2001	**Post-doctorate Fellow**	**Mathematical Sciences Research Institute**
June-July 2000	**Liftoff Mathematician**	**Clay Mathematics Institute**

PROFESSIONAL DEVELOPMENT

2013-2019 **Abilitazione** (Abilitation) to Full Professor, Italian Ministry of Research, Science, and the University (MUIR).

GRANTS AND AWARDS

Honors and Awards

2011 **Association for Women in Mathematics, Ruth I. Michler Memorial Prize**.

Grants

	US National Science Foundation, Division of Mathematical Sciences:
2013-2016	**Grant 1312727**: *Analysis and computation of partial differential equations in Mechanics and related fields* (sole PI), $ 239,817
2012-2014	**Grant 1207940**: *A Conference on Partial Differential Equations: Analytic and Geometric Aspects* (co-PI), $ 37,000
2012-2015	**Grant 1153905**: *Timed for a Successful Career: NSF/AWM Travel Grants for Women in the Mathematical Sciences* (co-PI), $ 492,399
2010-2014	**Grant 1009713**: *Applied Analysis of Partial Differential Equations and Related Inverse Problems in Mechanics* (Sole PI), $ 191,095
	Grant 1009714: *Collaborative Research: Analysis of incompressible high Reynolds number flows* (PI), $15, 318
2007-2010	**Grant 0708902**: *Aspects of Fluid Mechanics and Elasticity from the Point of View of Microlocal and Fourier Analysis* (Sole PI), $ 125,000
2004-2008	**Grant 0405803**: *A Micro-Local and Fourier-Analytical Approach to Some Non-Linear Problems in Fluid Mechanics and Elasticity* (Sole PI), $ 111,280
2004	**Association for Women in Mathematics** Travel Grant
2001	**Association for Women in Mathematics** Travel Grant

VISITING POSITIONS

September - November 2014	Institute for Pure and Applied Mathematics, Los angeles
January - May 2012	Michler Fellow, Cornell University, Ithaca
January - June 2010	Institute for Mathematics and its Applications, Minneapolis
August-September 2010 **October, 2008**	Mathematical Sciences Research Institute, Berkeley
December, 2008	University of Florence, Florence, Italy
May, 2009 **May 2006, 2007** **August, 2002**	IMECC, UniCamp, Campinas, Brazil

PUBLICATIONS

Articles Published in Peer-Refereed Journals

[1] C. Lacave, A. Mazzucato, The vanishing viscosity limit in the presence of a porous medium. *Mathematische Annalen*, 2015, doi: 10.1007/s00208-015-1313-x. Published online October 19, 2015.

[2] M. C. Lopes Filho, A. L. Mazzucato, H. J. Nussenzveig Lopes, D. Niu, E. S. Titi, Planar limits of three-dimensional incompressible flows with helical symmetry. *Journal of Dynamics and Differential Equations*, **26** (2014), n. 4, 843-869.

[3] G. Alberti, G. Crippa, A. L. Mazzucato, Exponential self-similar mixing and loss of regularity for continuity equations. *Comptes Rendus de l'Académie des Sciences de Paris, Series I*, **352** (2014), 901–906.

[4] A. L. Mazzucato, V. Nistor, Q. Qu, Quasi-optimal rates of convergence for the Generalized Finite Element Method in polygonal domains. *Journal of Computational and Applied Mathematics* **263** (2014), 466 – 477.

[5] I. Kukavica, A. Mazzucato, A. Tuffaha, Sharp trace regularity for an anisotropic elasticity system. *Proceedings of the American Mathematical Society* **141** (2013), 2673–2682.

[6] A. L. Mazzucato, V. Nistor, Q. Qu. A non-conforming Generalized Finite Element Method for transmission problems. *SIAM Journal on Numerical Analysis* **51** (2013), n.1, 555-576.

[7] E. Lunasin, Z. Lin, A. Novikov, A. Mazzucato, and C. Doering, Optimal mixing and optimal stirring for fixed energy, fixed power or fixed palenstrophy flows. Special Issue "Incompressible Fluids, Turbulence, and Mixing." *Journal of Mathematical Physics* **53**, 115611 (2012), 15 pages.

[8] B. Haines, A L. Mazzucato, A proof of Einstein's effective viscosity for a dilute suspension of spheres, *SIAM Journal on Mathematical Analysis* **44** (2012), no. 3, 2120-2145.

[9] N. Balci, A. L. Mazzucato, J. Restrepo, G. R. Sell, Ensemble dynamics and bred vectors. *Monthly Weather Review* **140** (2012), no. 7, 2308-2334.

[10] D. Han, D. Niu, A. L. Mazzucato, X. Wang, Boundary layer for a class of nonlinear pipe flow. *Journal of Differential Equations* **252** (2012), no. 12, 6387–6413.

[11] E. Beretta, E. Bonnetier, E. Francini, A. L. Mazzucato. Small volume asymptotics for anisotropic elastic inclusions. *Inverse Problems and Imaging* **6** (2012), no. 1, 1–23.

[12] A. L. Mazzucato, D. Niu, X. Wang. Boundary layer associated to a class of 3D nonlinear plane parallel channel flows. *Indiana University Mathematics Journal* **60** (2011), no. 4, 1113–1136.

[13] W. Cheng, N. Costanzino, J. Liechty, A. L. Mazzucato, and V. Nistor. Closed-form asymptotics and numerical approximations of 1D parabolic equations with applications to option pricing. *SIAM Journal on Financial Mathematics* **2** (2011), 901–934.

[14] A. Mazzucato, M. Taylor. Vanishing viscosity limits for a class of circular pipe flows. *Communications in Partial Differential Equations* **36** (2011), no. 2, 328 – 361 .

[15] R. Costantinescu, N. Costanzino, A. L. Mazzucato, and V. Nistor. Approximate solutions to second order parabolic equations I: analytic estimates. *Journal of Mathematical Physics* **51** (2010), 103502 (26 pp.)

[16] C. Bacuta, A. L. Mazzucato, V. Nistor, L. T. Zikatanov, Interface and mixed boundary value problems on n-dimensional polyhedral domains. *Documenta Mathematica* **15** (2010), 687–745.

[17] H. Li, A. Mazzucato, V. Nistor, Analysis of the Finite Element Method for transmission/mixed boundary value problems on general polygonal domains, *Electronic Transactions on Numerical Analysis* **37** (2010), 41–69.

[18] A. L. Mazzucato, V. Nistor, Well-posedness and regularity for the elasticity equation with mixed boundary conditions on polyhedral domains and domains with cracks, *Archive for Rational Mechanics and Analysis* , **195** (2010) no. 1, 25–73.

[19] M. C. Lopes Filho, A. Mazzucato, H. J. Nussenzveig Lopes, M. Taylor, Vanishing viscosity limits and boundary layers for circularly symmetric 2D flows. *Bulletin of the Brazilian Mathematical Society, New Series*, **39** (2008), no. 4, 471–513.

[20] A. Mazzucato, M. Taylor, Vanishing viscosity plane parallel channel flow and related singular perturbation problems, *Analysis & PDE* **1** (2008), no. 1, 35–93.

[21] M. C. Lopes Filho, A. L. Mazzucato, H. J. Nussenzveig Lopes, Vanishing viscosity limit for incompressible flow inside a rotating circle, in "Perspectives in Fluid Dynamics", *Physica D: Nonlinear Phenomena* **237** (2008), no. 10–12, 1324–1333.

[22] A. L. Mazzucato, L. V. Rachele, On transversely isotropic elastic media with ellipsoidal slowness surfaces, *Mathematics and Mechanics of Solids*, **13** (2008), no. 7, 611–638.

[23] A. L. Mazzucato, L. V. Rachele, On uniqueness in the inverse problem for transversely isotropic elastic media with a disjoint wave mode, *Wave Motion* **44** (2007), no. 7–8, 605–625.

[24] A. L. Mazzucato, V. Nistor, Mapping properties of heat kernels, maximal regularity, and semi-linear parabolic equations on noncompact manifolds, *Journal of Hyperbolic Differential Equations* **3** (2006), no. 4, 599–629.

[25] A. L. Mazzucato, L. V. Rachele, Partial uniqueness and obstruction to uniqueness in inverse problems for anisotropic elastic media. *Journal of Elasticity* **83** (2006), no. 3, 205–245.

[26] M. C. Lopes Filho, A. L. Mazzucato, H. J. Nussenzveig Lopes, Weak solutions, renormalized solutions and enstrophy defects in 2D turbulence, *Archive for Rational Mechanics and Analysis* **179** (2006), no. 3, 353–387.

[27] A. L. Mazzucato, On the energy spectrum for weak solutions of the Navier-Stokes equations, *Nonlinearity* **18** (2005), no. 1, 1–19.

[28] A. L. Mazzucato, Decomposition of Besov-Morrey spaces, in "Harmonic Analysis at Mount Holyoke", 279–294, *Contemporary Mathematics* **320**, American Mathematical Society, 2003.

[29] A. L. Mazzucato, Besov-Morrey spaces: function space theory and applications to nonlinear PDE, *Transactions of the American Mathematical Society* **355** (2003), no. 4, 1297–1364.

Manuscripts Accepted in Peer-Refereed Journals

[30] S. nicaise, H. Li, A. Mazzucato, Regularity and a priori error analysis of a Ventcel problem in polyhedral domains. To appear in *Mathematical Methods in the Applied Sciences.*

Manuscripts Submitted to Peer-Refereed Journals

[31] S. Zhang, A. L. Mazzucato, V. Nistor, Heat Kernels, Solvable Lie Groups, and the Mean Reverting SABR Stochastic Volatility Model. Preprint arxiv:1605.03097.

[32] G. Alberti, G. Crippa, A. L. Mazzucato. Exponential self-similar mixing by incompressible flows. Preprint arxiv:1605.02090.

Proceedings Articles in Peer-Refereed Journals

[33] A. Mazzucato, C. Bacuta, and V. Nistor, Anisotropic regularity and optimal rates of convergence for the Finite Element Method on three dimensional polyhedral domains. *Advances in Mathematics* (Proceedings of The Seventh Congress of Romanian Mathematicians, June 29 - July 5, 2011, Brasov, Rumenia), pp. 57-73, Editura Academiei, Bucharest.

[34] A. L. Mazzucato, On the zero viscosity limit in incompressible fluids. *Physica Scripta* **T132** (2008), 014002 (6 pp). Proceedings of the 1s t International Conference "Turbulent Mixing and Beyond", ICTP, Trieste, 18-26 August 2007.

Invited Articles

[34] Y. Maekawa, A. L. Mazzucato, *Inviscid Limit And Boundary Layer Of The Navier-Stokes Flow*, Handbook of Mathematical Analysis in Mechanics of Viscous Fluids (Editors: Y. Giga and A. Novotný), Springer (under review).

STUDENTS

PhD students:

2012-present **Siyan Zhang**, Ph.D. Thesis: *Heat Kernels, Exponentials in Solvable Lie Groups, and the Mean Reverting SABR Model.* Defended May 2016, expected graduation date August 13, 2016.
Yajie Zhang, project on transmission problems for parabolic equations. Expected graduation date May 2017.

2008–2011 **Wen Cheng**, co-advised with Victor Nistor,
Ph.D. Thesis: *Approximate Solutions to Second Order Parabolic Equations with Applications to Option Pricing*, graduated December 2011.
(Currently at JP Morgan.)

2007–2012 **Qingqin Qu**, co-advised with Victor Nistor,
Ph.D. Thesis: *The Generalized Finite Element Method: numerical treatment of singularities, interfaces, and boundary conditions*, graduated August 2012.
(Currently at Idaho State University.)

Graduate Research Assistants:

Summer 2014	**Chao Liang**, partially supported with funds from NSF grant DMS-1009713.
2013-2014	**Qingtian Zhang**, partially supported with funds from NSF grant DMS-1009714.
2011	**Carol Gaertner**, partially supported with funds from NSF grant DMS-1009714.

Undergraduate students:

2016– present	**Simranjeet Singh**, work in progress on Financial Mathematics and PDEs.
2011 – 2015	**Luke Edwards**, co-supervised with V. Nistor, Project Title: *A Green's Function Numerical Method for Parabolic Partial Differential Equations*, *SIURO (SIAM Undergraduate Research Online)*, Vol. 9 (2016).
2010–2014	**Bingqian Lu**, Honors Thesis (2014): *Transformation optics methodology review and its appplication to antenna lens designs* (previous project on *Monte Carlo simulations and option pricing*).
2013–2014	**Yifan Jiang**, Project Title: *Finite Element Analysis of a One-dimensional Helmholtz Equation.*
Fall 2011	**Matt Fennema**
Fall 2010	**Lance Boyer**, Maple Project on Taylor expansions and commutators of operators.
2008–2010	**Anirban Roy**, co-supervised with V. Nistor, Project Title: *On numerical methods for elliptic transmission eigenvalue problems. SIAM Undergraduate Research Online.* Vol. 4 (2011).
2007–2009	**Fara Delitsky**, co-supervised with V. Nistor, Project Title: *Numerical methods for elliptic equations and linear algebra.*

REU students:

2015 **Javier Mosquera**, work in progress on parabolic equations/financial calculus.

2014 **Adam Stawski**, project on growth modes for the Kuramoto-Sivashinski equation,
Creed Reilly, Project title: *Solving a transmission problem for the 1D Diffusion Equation.*

2013 **Cory Grube** and **Patrick Mangan**: Project title: *Application of the Finite Element Method to Poisson's equation.*
Hongyuan Zhan and **Yikun Zhao**: Project title: *Visualization of mixing of a passive tracer by incompressible flows.*

PhD Committees (2003-present): Juan Bautista, Vitaliy Gyrya, Brian Haines, Brian Nowakowski, Giancarlo Facchi, Nestor Handzy, Arkadz Kirshtein, Chao Liang, Hengguang Li, Tianjiang Li, Olexandr Mesiats, Jun Ni, Brian Nowakowski, Yu Qiao, Shawn Ryan, Chao Tian, Johannes Van Erp, Kai Yang, Deling Wang, Qingtian Zhang, Xiaofei Zheng, Yunrong Zhu.

INVITED TALKS

Talks at University or Institute Seminars

1 *Optimal mixing and stirring in incompressible flows* , Mathematics Colloquium, University of Houston, Houston, TX (March 23, 2016).

2 *The vanishing viscosity limit in porous media*, Analysis of Fluids and Related Topics Seminar, Princeton University, Princeton, NJ (December 3, 2015).

3 *"Asymptotics for the displacement in elastic media perturbed by small inclusions*, Inverse Problems Seminar, University of Delaware, Newark, DL, (December 2, 2015).

4 *Optimal mixing and Stirring in Incompressible Flows*, Mathematics Seminar Series, New York University-Abu Dhabi, Abu Dhabi, UAE (November 22, 2015).

5 *Green-function methods for pricing of options*, Financial Mathematics Seminar, University of Lisbon, Lisbon, Portugal (June 9, 2015)

6 *Mixing and transport by incompressible flows*, Mathematics Colloquium, University at Albany, Albany, NY (February 27, 2015)

7 *Optimal mixing by incompressible flows*, Joint Nonlinear Analysis/PDE Seminar, Rutgers University, Piscataway, NJ (December 2, 2014)

8 *Optimal mixing by incompressible flows*, Mathematics Colloquium, University of Toledo, Toledo, OH (November 21, 2014)

9 *Self-similar mixing and loss of regularity for continuity equations*, Joint UCLA/Caltech Analysis Seminar, Caltech, Loa Angeles, CA (November 7, 2014)

10 *Optimal mixing by incompressible flows*, CAMS Colloquium, University of Southern California, Los Angeles, CA (September 15, 2014)

11 *Analisi dello strato limite per una classe di flussi incomprimibili non lineari* (*Boundary layer analysis for a class of incompressible non-linear flows*, in Italian), Calculus of Variations Seminar, Politecnico, Milan, Italy (June 23, 2014)

12 *Boundary layer analysis for pipe and channel flows*, PDE Seminar, Université de Lorraine, Metz, France (June 13, 2014)

13 *Fluids flow at high Reynolds numbers*, Mathematics Colloquium, George Washington University, Washington D.C. (September 27, 2013)

14 *Green's functions for time-dependent Fokker-Planck equations*, CSCAMM Seminar, University of Maryland, College Park, MD (September 25, 2013)

15 *Effective viscosity in dilute suspensions*, Applied Math Seminar, University of Southern California, Los Angeles, CA (June 14, 2013)

16 *Enstrophy dissipation in 2D incompressible fluids*, Analysis Seminar, Basel University, Basel, Switzerland (May 15, 2013)

17 *Incompressible Fluid Flows at High Reynolds Numbers*, Mathematics Colloquium, Distinguished Women Scientist and Engineers Series, University of Minnesota, Minneapolis, MN (March 7, 2013)

18 *Asymptotic expansions for the displacement in elastic media with small inclusions*, PDE Seminar, University of Minnesota, Minneapolis, MN (March 6, 2013)

19 *Boundary layers for a class of non-linear flows in pipes and channels*, Analysis Seminar, UCLA, Los Angeles, CA (February 8, 2013)

20 *Effective viscosity in dilute suspensions of spheres*, Analysis/PDE Seminar, UFRJ, Rio de Janeiro, Brazil (October 4, 2012)

21 *Boundary layer analysis for certain classes of non-linear incompressible flows*, Analysis Seminar, SUNY, Binghamton (April 11, 2012)

22 *Ensemble Dynamics and "Bred Vectors"*, Ellis B. Stouffer Colloquium, University of Kansas, Lawrence (April 7, 2012)

23 *Boundary layer analysis for certain non-linear fluid flows*, Analysis/PDE Seminar, UNC, Chapel Hill (April 3, 2012)

24 *Explicit parametrices for time-dependent Fokker-Planck equations*, Applied Math and Analysis Seminar, Duke University, Durham (April 2, 2012)

25 *The Analysis of Incompressible Fluids at High Reynolds Numbers*, Michler Memorial Lecture, Cornell University, Ithaca (March 8, 2012)

26 *Ensemble dynamics and Bred Vectors*, PDE/Applied Math Seminar, Indiana University, Bloomington (February 13, 2012)

27 *Boundary layers in incompressible fluid flow*, Mathematics Colloquium, University of Illinois, Chicago, (February 10, 2012)

28 *Boundary Layer Analysis for some non-linear flows* (in Italian), Analysis Seminar, Universitá di Palermo, Italy (December 21, 2011)

29 *Asymptotic expansions for the displacement in elastic media with small inhomogeneities*, Differential Equations Seminar, University of Michigan, Ann Arbor (October 27, 2011)

30 *Approximate Solutions to forward kolmogorov equations*, Capital Normal University, Beijing, China (June 8, 2011)

31 *A study of nonlinear PDE's appearing in Finance* (seminar series joint with V. Nistor), Mathematical Finance and Probability Seminar, Rutgers University, New Brunswick (April 12, 2011)

32 *Vanishing viscosity limit and boundary layers in Couette flows*, Midwest PDE Seminar, University of Illinois, Urbana-Champaign (March 20, 2011)

33 *Explicit parametrices for Fokker-Planck equations*, Applied Mathematics Seminar, University of California, Davis (February 10, 2011)

34 *Vanishing viscosity limit and boundary layers in incompressible flows*, CAMS Colloquium, University of Southern California (February 7, 2011)

35 *Boundary layer analysis for non-linear channel flows* (in Italian), Analysis Seminar, Universitá di Pisa, Pisa, Italy, (December 16, 2010)

36 *The vanishing viscosity limit for channel and pipe flows*, CNA Seminar, Carnegie Mellon University (October 26, 2010)

37 *Explicit approximate Green's function for parabolic equations*, MSRI Inverse Problems Seminar (September 17, 2010)

38 *Finite Element Method for mixed boundary value/interface problems on generalized polygons*, Solids and Continuum Mechanics Seminar, University of Minnesota (April 20, 2010)

39 *Vanishing Viscosity Limits and Singular Perturbation Problems*, PDE Seminar, University of Minnesota (March 10, 2010)

40 *Dissipation in turbulent flows*, Mathematics Colloquium, Drexel University (November 19, 2009)

41 *Uniqueness in the boundary inverse problem for elasticity*, PDE Seminar, Georgia Institute of Technology (November 11, 2008)

42 *Dissipation in turbulent flows*, Colloquium, Center for Applied Mathematical Sciences, University of Southern California (October 20, 2008)

43 *Dissipation in turbulent flows*, Mathematics Colloquium, University of California, Santa Cruz, (October 14, 2008)

44 *Incompressible Fluid Flow in the Zero Viscosity Limit*, Scattering and Spectral Theory Seminar, Purdue University, West Lafayette (April 3, 2008)

45 *On the vanishing viscosity limit for incompressible fluids*, PDE/Applied Math Seminar, Indiana University, Bloomington (March 24, 2008)

46 *On uniqueness in an inverse problem for anisotropic elastic media* (in Italian), Analysis Seminar, State University, Florence, Italy, (January 11, 2008)

47 *Vanishing viscosity limit for 2D flows inside an unsteadily rotating circle*, Analysis Seminar, University of Warwick, Coventry, UK (August 1, 2007)

48 *On the regularity and self-similarity of solutions to the 3D Navier-Stokes equations*, PDE Seminar, Ohio State University (March 7, 2007)

49 *On unique determination of elastic parameters for anisotropic elastic media from dynamic boundary measurements*, Analysis Seminar, University of Southern California (November 28, 2006)

50 *Vanishing viscosity limit for 2D flows in an unsteadily rotating circle*, Applied Mathematics Seminar, University of California, Irvine (November 27, 2006)

51 *Some harmonic analysis results for the Euler and Navier-Stokes equations*, Fluid Mechanics Seminar, UniCamp, Campinas, Brazil (May 30, 2006)

52 *Some uniqueness results in the inverse problem for anisotropic elastic media*, Applied Mathematics Seminar, University of Delaware, Newark (November 15, 2005)

53 *Irregular transport and enstrophy dissipation in two-dimensional incompressible flows*, Analysis Seminar, Princeton University (October 6, 2005)

54 *Enstrophy dissipation and irregular transport in two-dimensional incompressible flows*, Applied Mathematics Seminar, S.I.S.S.A., Trieste, Italy (July 19, 2005)

55 *Uniqueness and Nonuniqueness in the Inverse Problems for Anisotropic Elastic Media*, PDE Seminar, Brown University (April 22, 2005)

56 *Enstrophy dissipation for two-dimensional incompressible flows*, Applied Mathematics and Analysis Seminar, Duke University (February 28, 2005)

57 *Enstrophy dissipation in 2D turbulence*, Analysis Seminar, Cornell University (March 15, 2004)

58 *The Navier-Stokes equations in spaces of Besov-type*, Mathematics Department Colloquium, Universidade Federal de SÃo Carlos, São Carlos, Brazil (August 28, 2002)

59 Minicourse *The Navier-Stokes equation in critical spaces*, UNICAMP, Campinas, Brazil (August 12, 14, 19, 2002)

60 *Mild Solutions to the Navier-Stokes equation and Besov-Morrey spaces* (in Italian), Applied Mathematics Seminar, Universitá Statale di Milano, Milan, Italy (July 12, 2002)

61 *A class of function spaces and the Navier-Stokes equation*, PDE Seminar, University of Minnesota (April 3, 2002)

62 *Function Spaces and Non-linear PDEs*, Analysis Seminar, University of California, Berkeley (November 27, 2001)

63 *Pseudo-differential calculus in Besov-like spaces*, Analysis Seminar, Brown University (April 25, 2001)

64 Applied Analysis & Computation Seminar, University of Massachusetts at Amherst, April 3, 2001.

65 Analysis Seminar, Yale University, September 13, 2000.

Talks at Conferences and Professional Meetings

1 *Heat kernels, maximal regularity, and semi-linear parabolic equations on non-compact manifolds*, International Conference on Evolution Equations, Vanderbilt University, Nashville, TN, May 16-20, 2016.

2 *The vanishing viscosity limit in porous media*, Workshop on "Euler and Navier-Stokes Equations and Connected Topics", Wolfang Pauli Institute, Vienna, Austria, December 14-18, 2015.

3 *Optimal Mixing Rates*, Minisymposium "Recent Developments in the Analysis of the Navier-Stokes, Euler, and Related Models", SIAM APDE Conference, Society for Industrial and Applied Mathematics, Scottsdale, AZ, December 7-10, 2015.

4 *The vanishing viscosity limit in porous media*, Minisymposium " Singular Perturbations and Boundary Layers - Theory and Numerical Aspects", SIAM APDE Conference, Society for Industrial and Applied Mathematics, Scottsdale, AZ, December 7-10, 2015.

5 *Optimal mixing by incompressible flows*, Workshop on "Mathematics of Geophysical Flows and Turbulence", Fudan University, Shanghai, China, August 17-19, 2015.

6 *Mixing and loss of regularity for transport equations*, Workshop "Mathematical aspects of Hydrodynamics", Oberwolfach, Germany, August 5-9, 2015.

7 *Elliptic Equations on Polyhedral Domains*, Workshop for Women in Analysis and PDE, Institute for Mathematics and its Applications, Minneapolis, MN, May 28-31, 2015.

8 *On helically-symmetric incompressible flows*, Special Session on Nonlinear Elliptic and Parabolic PDEs, AMS Spring Western Meeting, Las Vegas, NV, April 18-19, 2015.

9 *The vanishing viscosity limit in porous media*, Special Session "Mathematical Fluid Dynamics and Turbulence", spring Eastern Meeting, Washington, DC, March 7-8, 2015.

10 *Mixing and Transport by Incompressible Flows*, SIAM Minisymposium on Partial Differential Equations and Applications, Joint Mathematics Meetings, San Antonio, Jan 10-13, 2015.

11 *Optimal mixing by Incompressible flows* (2-hour minicourse), NSF-CBMS Regional Research Conference in the Mathematical Sciences, Oklahoma State University, July 21-25, 2014.

12 *Planar limits of 3D helical flows*, Conference "Advances in Mathematical Fluid Mechanics", Lison, Portugal, June 30- July 4, 2014,

13 *Boundary layers for non-linear flows in pipes and channels*, Mathematical Hydrodynamics Conference, École Normale Superieure, Paris, France, June 16-20, 2014.

14 *Green's functions for Fokker-Planck equations*, Special Session on Stochastics and PDEs, AMS Spring Western Meeting, Albuquerque, NM, April 5-6, 2014.

15 *Vorticity concentration at the boundary for Taylor-Couette flows in the zero viscosity limit*, SIAM Minisymposium on Turbulence and Mixing in Fluids: Analysis and Applications, Joint Mathematics Meetings, Baltimore, MD, Jannuary 15-18, 2014.

16 *Planar limits of 3D helical flows*, Minisymposium "Recent Progress on the Incompressible Euler Equations", SIAM APDE Conference, Lake Buena Vista, FL, December 7-10, 2013.

17 *Boundary layers in non-linear pipe and channel flows*, Clifford Lectures, Tulane University, New Orleans, LA, November 8-11, 2013.

18 *Green function methods for pricing of options*, Special Session on Partial Differential Equations, Stochastic Analysis, and Applications to Mathematical Finance, AMS Fall Eastern Meeting, Philadelphia, PA, October 12-13, 2013.

19 *Well-posedness and regularity for elliptic equations on polyhedral domains*, AMS Fall Southeastern Sectional Meeting, Louisville, KY, October 5-6, 2013.

20 *An existence result for a fluid-structure interaction model*, Special Session "PDE and Incompressible Fluid Flow", Congress of the Americas, Guanajuato, Mexico, August 4-9, 2013.

21 *Boundary layers for non-linear flows in pipes and channels*, Workshop "Geophysical Fluid Dynamics", Oberwolfach, Germany, February 17-23, 2013.

22 *Boundary layers for a class of non-linear flows in pipes and channels*, Workshop on Complex Fluids, Darmstadt, July 10-13, 2012.

23 *Vanishing Viscosity Limit for a certain class of channel flows*, Special Session on Singular Perturbations and Boundary Layer Theory, and *Effective viscosity in dilute suspensions*, Special Session on Analysis and Numerics of Differential Equations and Dynamical Systems in Mathematical Fluid Mechanics, 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications Orlando, July 1 - 5, 2012.

24 *Enstrophy dissipation in 2D incompressible fluids*, Workshop on Geometry and Dynamics of Fluid, CRM, Montreal, May 21-25, 2012.

25 *Boundary layer analysis for certain classes of nonlinear incompressible flows*, Minisymposium "Recent advances on nonlinear PDEs and their dynamics", International Conference on Structural Nonlinear Dynamics and Diagnosis, Marrakech, Morocco, April 30-May 2, 2012.

26 *Boundary layer analysis and vanishing viscosity limit for pipe flows*, Minisymposium "Analysis of partial differential equations arising in fluid dynamics", SIAM APDE Conference, San Diego, November 14-17, 2011.

27 *Boundary Layers for channel and pipe flows*, Session on nonlinear Wave Phenomena, AWM Anniversary Conference, Providence, September 17-18, 2011.

28 *Ensemble Dynamics and Bred Vectors*, Plenary Invited Talk, ICDEA, Trois-Rivières, Canada, July 25-29, 2011.

29 *Boundary-layer analysis for channel flows*, Minisymposium "Fluid-Structure Interaction", ICIAM, Vancouver, July 18-22, 2011.

30 *Effective viscosity in dilute suspensions*, Xi'an Conference Celebrating Professor Constantin's 60th Birthday, Xi'an, China, June 13-17, 2011.

31 *Explicit parametrices for time-dependent Fokker-Planck equations*, Special Session "Deterministic and Stochastic PDEs", AMS Fall Central Meeting, Notre Dame, November 5-7, 2010.

32 *Boundary layer analysis for 3D plane-parallel channel flows*, Special Session "Applications of Nonlinear PDEs", AMS Southwestern Meeting, Los Angeles, October 9-10, 2010.

33 *The vanishing viscosity limit in channel and pipe flows*, Conference "Recent Developments in Nonlinear Evolution Equations" Weizmann Institute, Rehovot, Israel, July 23-29, 2010

34 *An approximate Green-function algorithm for solving Fokker-Planck equations*, Special Session "Differential Equations and Applications", Spring Central AMS Meeting, St. Paul, MN, April 9-10 2010

35 *Vanishing viscosity limit and related singular perturbation problems*, Minisymposium "PDE and Fluid Dynamics", SIAM APDE Meeting, Miami, FL, Dec 7-10, 2009

36 *On the vanishing viscosity limit in incompressible flows*, Special Session " Fluid Mechanics", Fall SouthWestern AMS Meeting, Riverside, CA, Nov 7-8, 2009

37 *Approximate solutions to parabolic equations*, Special Session "Harmonic analysis and PDE", Fall SouthCentral AMS Meeting, Waco, TX, Oct 16-17, 2009

38 *Determination of material properties from boundary measurements in anisotropic elastic media*, Minisymposium "Inverse Problems in Elasticity" AIP 09, Vienna, July 20, 2009.

39 *Vorticity concentration for 2D circularly symmetric flows in the presence of moving boundaries*, Special Session "Advances in Classical and Geophysical Fluid Dynamics", AMS Spring Central Meeting, Bloomington, Indiana (April 6, 2008)

40 *Vanishing viscosity limit for flow in a channel and related singular perturbation problems*, Special Session "Harmonic Analysis Methods in Mathematical Fluid Mechanics", AMS Spring Central Meeting, Bloomington, Indiana (April 5, 2008)

41 *Enstrophy dissipation in 2D incompressible fluids*, Special Session "Recent developments in 2D turbulence", AMS Fall Southwestern Meeting, Albuquerque, New Mexico (October 14, 2007)

42 *Vanishing viscosity limit in boundary-driven 2D flow*, Special Session "The Euler and Navier-Stokes", AMS Fall Central Meeting, Chicago, Illinois (October 5, 2007)

43 *On uniqueness in the boundary inverse problem for anisotropic elastodynamics*, Minisymposium "Inverse Problems for Systems", International Conference "Applied Inverse Problems 07", Vancouver, Canada (June 28, 2007)

44 *On the energy spectrum for weak solutions of the Navier-Stokes equation*, Special Session on Harmonic Analysis and Partial Differential Equations, AMS Southeastern Meeting, Miami, Florida (April 1, 2006)

45 *Harmonic Analysis for the Navier-Stokes and Euler equations*, Workshop " Euler equations: theory and numerical simulations", Wolfgang Pauli Institute, Vienna, Austria (March 14, 15, 2006)

46 *Nonuniqueness in the parameter identification for anisotropic elastodynamics*, Special Session on Inverse Problems, AMS Fall Southeastern Meeting, Vanderbilt University, Nashville, Tennessee (October 17, 2004)

47 *Enstrophy dissipation for two-dimensional incompressible flows*, Workshop "Analytical and Computational Challenges of Incompressible Flows at High Reynolds Number", CSCAMM, College Park, Maryland (May 18, 2004)

48 *Enstrophy dissipation in 2D Turbulence*, Special Session on Fluid Problems and Related Questions, AMS Western Meeting, University of Southern California, Los Angeles, California (April 3, 2004)

49 *Mild solutions to the Navier-Stokes equation in Besov-Morrey spaces*, Mini-symposium "Analysis and incompressible fluid flow", AMAM 2003, Nice, France, (February 11, 2003)

50 *Analysis in Besov-Morrey Spaces and applications to the Navier-Stokes equation*, Special Session on Function Spaces, Singular Integral and Applications to PDEs, AMS Southeastern Fall Meeting, Orlando, Florida (November 10, 2002)

51 *The Navier-Stokes equation in distribution spaces*, Special Session " Mathematical Fluid Dynamics", 2002 UAB International Conference on Differential Equations and Mathematical Physics, University of Alabama, Birmingham, Alabama (March 29, 2002)

52 Special Session "Harmonic Analysis and PDE", AMS Fall Western Section Meeting, University of California at Irvine, November 11, 2001.

TEACHING AND SERVICE

- **Panel** and **External Reviewer** for the National Science Foundation. **Reviewer** for the US Civilian Research and Development Foundation, for the Austrian Academy of Sciences, for the Canadian Fonds Québécois de la Recherche sur la Nature et les Technologies, for Canada MITACS, for the Polish National Science Centre, and for the Laboratory of Excellence NUMEV, University of Montpellier.
- **Member**, Council of the American Mathematical Society, (2016-2019).
- **Member**, Committee on Science Policy, American Mathematical Society, (2016-2019).
- **Member**, Stefan Bergman Trust Fund Committee, American Mathematical Society (2016-2019).
- **Member**, SIAM Coordinating Committee of the Joint Mathematics Meetings (2016-2019).
- **Secretary**, Activity Group on Analysis of Partial Differential Equations, Society for Industrial and Applied Mathematics (2013-2014).

- **Associate Editor**, *Journal of Mathematical Analysis and Applications* (2015-present), *SIAM Journal on Mathematical Analysis* (2015-present), *European Journal of Pure and Applied Mathematics* (2007-present).
- **Co-Editor** (with G. Crippa), Volume "Transport, mixing and Fluids", De Gruyter Open (in progress).
- **Referee** for: *Acta Applicanda Mathematicae*, *Applicable Analysis*, *Asymptotic Analysis*, *Archive for Rational Mechanics and Analysis*, *Canadian Mathematical Bulletin*, *Central European Journal of Mathematics*, *Communications in Mathematical Physics*, *Communications in Mathematical Sciences*, *Communications in Partial Differential Equations*, *Differential and Integral Equations*, *Discrete and Continuous Dynamical Systems, Series-A*, *Functiones et Approximatio*, *Illinois Journal of Mathematics*, *Indiana university Mathematics Journal*, *Interfaces and Free Boundaries*, *International Journal of Mathematics and Mathematical Sciences*, *International Mathematics Research Notices*, *Inventiones*, *Journal of Differential Equations*, *Journal of Fluid Mechanics*, *Journal of Mathematical Analysis and Applications*, *Journal of Mathematical Physics*, *Mathematical Methods in the Applied Sciences*, *Michigan Mathematical Journal*, *Nonlinearity*, *Physica D*, *Potential Analysis*, *Quarterly Journal of Mechanics and Applied Mathematics*, *SIAM Journal on Mathematical Analysis*, *SIAM Journal on Applied Mathematics*, *Transactions of the American Mathematical Society*.
- **Reviewer** for the American Mathematical Society *Mathematical Reviews* (2003–present).
- **Member**, Committee on Meetings and Conferences, American Mathematical Society (2012-2014).
- **Member**, Committee for the AMS-Simon Travel Grants (2011-2013).
- **Member** and **Chair**, Committee for the NSF-AWM Travel Grants (2012, February 2013).
- **Member** (2009-2010) and **Chair** (2011), Committee for the AMS-MAA-SIAM Morgan Prize for Outstanding Research done by an Undergraduate.
- **Mentor**, Association for Women in Mathematics Mentor Network (2003–present)
- **Department Service:** Computer Committee (2013-2016), Chair 2015-2016;
  Promotion and Tenure Committee (2013-2014, 2015-2017);
  Policy Committee (2010-2013);
  Hiring Committee (2009-2012);
  Climate and Diversity Committee Co-Chair (2006-2009);
  Qualifying Examinations Board Member (2008–2010);
  Library Committee (2004–2007);
- **University and College Service:** College representative to the Faculty Senate (2014-2018);
  Member, Senate LIST Committee (2014-2017; Vice-Chair 2016-2017);
  Member, Special Senate Committee Assessing First-Year Engagement Plan (2015-2016);
  Member of University task force for engagement with Brazil (2011-2013);
  College of Science IT Steering Committee (2011-2013).
- **Instructor** for graduate (Functional Analysis, Harmonic Analysis, Fluid Mechanics, Real & Complex Analysis, PDEs) and undergraduate courses (Advanced Calculus for

Engineers, Calculus sequence, Fourier Series & PDEs, Real Analysis, Algebra for Teachers, ODEs)

- Contact Organizer, Workshop "Recent Advances in Hydrodynamics", BIRS, Banff, Canada, June 6-10, 2016.
- Organizing Committee, Summer School on Transport, Fluids and Mixing (an activity of CIRM), Levico Terme (Trento), Italy, June 20-24, 2015.
- Organizing Committee, School "Around vortices: from classical to quantum mechanics", IMPA, Rio, Brazil, March 12-21, 2014.
- Organizing Committee, Conference on Partial Differential Equations: geometric and analytic aspects, UNC, Chapel Hill, July 16-20, 2012.
- Scientific Committee, 3rd Workshop on Fluids and PDE, UniCamp, Campinas, Brazil, June 27-July 1, 2011.
- Co-organized:
  - Session "Singular problems in fluid mechanics", International Conference on Evolution Equations, Vanderbilt University, Nashville, TN (May 16-20, 2016);
  - SIAM Minisymposium on Applied analysis of partial differential equations, with G. Iyer, Joint Mathematics Meetings, Seattle, WA, (January 6-9, 2016);
  - Special Session "PDEs in Continuum Mechanics", with M. Gualdani, 2015 AWM Research Symposium, College Pak, MD (April 11-12, 2015);
  - Workshop "Mathematical Analysis of Turbulence", Long Program on the Mathematics of Turbulence, IPAM, Los Angeles, CA (September 29 - October 3, 2014) with P. Constantin, G. Eyink, and M. Jolly;
  - Minisymposium "Deterministic and Stochastic Methods in Fluid Mechanics", with H. Bessaih and E. Lunasin, SIAM APDE Conference, Lake Buena Vista, FL (December 7-10, 2013);
  -Special Session "Analysis of PDEs in Newtonian and Non-Newtonian Fluid Mechanics", with Evelyn Lunasin, AWM Research Symposium, Santa Clara, CA (March 16-17, 2013);
  - Minisymposium "Advances in Geophysical Flows", with N. Balci and G. Sell, SIAM APDE Conference, San Diego (November 13-17, 2011);
  - Special Session "Topics in Mathematical Finance", with V. Nistor, N. Costanzino, AMS Fall Eastern Meeting, University Park, PA (October 24-25, 2009);
  -Special Session "Nonlinear PDEs and applications", with Igor Kukavica, AMS spring Central Meeting, Urbana, Illinois (March 28-29, 2009);
  - Minisymposium "Elliptic PDEs on Singular Domains: Computation and Theory", SIAM APDE, with Victor Nistor, Mesa, Arizona (Dec 10, 2007);
  - Special Session "Microlocal Analysis and PDE (in honor of Michael E. Taylor 60th birthday)", AMS Spring Southeastern Meeting, with Martin Dindos, Davidson, North Carolina (March 3-4, 2007);
  - Workshop "Partial differential equations on non-compact manifolds", with Victor Nistor and Juan Gil, State College, Pennsylvania (December 14-15, 2002);
- Supervised NSF VIGRE Summer Program in Mathematics for undergraduates, Yale University (May 15-July 15, 2001).

PROFESSIONAL SOCIETIES

2000-present	**American Mathematical Society**
2002-present	**Association for Women in Mathematics**
2003-present	**Society for Industrial and Applied Mathematics**
2009-present	**Inverse Problems International Association**