DONATELLA DANIELLI

EDUCATION

Laurea cum Laude	University of Bologna	1989
Ph.D. in Mathematics	Purdue University	1999
	(Ph. D. Advisor: Carlos E. Kenig)	

PROFESSIONAL EXPERIENCE

Teaching Assistant	Purdue University	1992-1999
Assistant Professor	Johns Hopkins University	1999-2001
Visiting Assistant Professor	Institut Mittag-Leffler	2000, Spring
Assistant Professor	Purdue University	2001-2004
Associate Professor	Purdue University	2004-2008
Professor	Purdue University	2008-
Visiting Fellow	Isaac Newton Institute	2014, Spring
Dean's Fellow	Purdue University	2018-2019

AWARDS AND HONORS

Post Lauream C.N.R. Fellowship	University of Bologna	1990-1991
I.N.D.A.M. Fellowship	I.N.D.A.M.	1990
P.R.F. Fellowship	Purdue University	1996-1997
C.N.R. Fellowship	Purdue University	1996-1998
Teaching for Tomorrow Award	Purdue University	2004-2005
Ruth and Joel Spira Graduate Teaching Award	Purdue University	2011
Butler Leadership in Action Award	Purdue University	2013
Simons Fellowship in Mathematics	Simons Foundation	2014
Fellow of the American Mathematical Society	AMS	2017
Academic Leadership Program Fellow	Big Ten Academic Alliance	2018-2019
Book of Great Teachers	Purdue University	2018
Fellow of the Association for Women in Mathematics	AWM	2020

RESEARCH INTERESTS

Partial Differential Equations, Geometric Measure Theory, Calculus of Variations, Applied Mathematics

GRADUATE STUDENTS

William E. Lindsey, May 2012; Agnid Banerjee, May 2014 (co-Chair); Thomas Backing, May 2016; Kevin Rotz, May 2016 (co-Chair).

POSTDOCTORAL ADVISEES

Tung To, 2008-2010; Veronica Quitalo, 2013-2016; Brian Krummel, 2018-2020; Alaa Haj Ali, 2019-.

RESEARCH FUNDING (PI: Donatella Danielli)

- ❖ NSF Grant DMS-0202801: Free Boundaries, PDE's, and Geometric Measure Theory. Duration: 6/15/02-5/31/05. Total award: $91,500 (reduced to $30,616 when CAREER award was made).
- ❖ NSF Grant DMS-0239771: CAREER: Analytical and Geometric Aspects of Partial Differential Equations. Duration: 6/01/03 – 5/31/10. Total award: $400,000.
- ❖ NSF Grant DMS-0801090: Analysis and Geometry of Nonlinear PDEs. Duration: 6/01/08 – 5/31/13. Total award: $237,750.
- ❖ NSF Grant DMS-1101246: Analytic and Geometric Properties of Variational Inequalities and PDEs. Duration: 9/15/2011 – 9/14/2015.Total award: $224,782.
- ❖ Simons Foundation: Analytic and Geometric Aspects of Variational Inequalities and PDEs. Duration: 7/1/2014 – 1/4/2015.Total award: $129,934.
- ❖ NSF Grant DMS-1500796: The Sixth Symposium on Analysis and PDEs. Duration: 1/15/2015-1/14/2016. Total award: $35,000.
- ❖ Purdue Research Foundation: The regularity of the Free Boundary for a Class of Parabolic Free Boundary Problems with Variable Coefficients. Duration: 6/1/2016-5/31/2016. Total award: $28,383.
- ❖ Purdue Research Refresh Program: Free boundary problems in the applied sciences. Duration: 6/1/2019-5/31/2019. Total award: $62,945.

OTHER FUNDING

- ❖ The Henry Luce Foundation: 2018-19 Clara Boothe Luce Fellowship, co-PI. Duration: 09/27/2017-05/31/2020. Total award: $300,000 (amount responsible: 20%).

PUBLICATIONS

1. Danielli, D., A compact embedding theorem for a class of degenerate Sobolev spaces. *Rendiconti Sem. Mat. Univ. Polit. Torino*, 49(3); 399-420, 1991.
2. Danielli, D., Formules de representation et theoremes d'inclusion pour des opérateurs sous-elliptiques. *Comptes Rendus Acad. Sci. Paris*, t. 314, Serie I; 987-990, 1992.
3. Capogna, L., Danielli, D., and Garofalo, N., Embedding theorems and the Harnack inequality for solutions of nonlinear subelliptic equations. *Comptes Rendus Acad. Sci. Paris*, t. 316, Serie I; 809-814, 1993.
4. Capogna, L., Danielli, D., and Garofalo, N., An embedding theorem and the Harnack inequality for nonlinear subelliptic equations. *Comm. in PDE*, 18; 1765-1794, 1993.
5. Capogna, L., Danielli, D., and Garofalo, N., Subelliptic mollifiers and a characterization of Rellich and Poincaré domains. *Rend Sem. Mat. Univ. Polit. Torino*, 51(4); 361-386, 1993.
6. Capogna, L., Danielli, D., and Garofalo, N., An isoperimetric inequality and the geometric Sobolev embedding for vector fields. *Mathematical Research Letters*, 1; 263-268, 1994.
7. Capogna, L., Danielli, D., and Garofalo, N., The geometric Sobolev embedding for vector fields and the isoperimetric inequality. *Comm. in Analysis and Geometry*, 2(2); 203-215, 1994.
8. Danielli, D., Regularity at the boundary for solutions of nonlinear subelliptic equations. *Indiana Univ. Math. Jour.*, 44(1); 269-286, 1995.
9. Capogna, L., Danielli, D., and Garofalo, N., Capacitary estimates and the local behavior of solutions of nonlinear subelliptic equations. *Amer. Jour. Mathematics,* 118(6); 1153-1196, 1996.
10. Capogna, L., Danielli, D., and Garofalo, N., Subelliptic mollifiers and a basic pointwise estimate of Poincaré type. *Math. Zeitschrift*, 226; 147-154, 1997.

PUBLICATIONS (cont.)

11.   Danielli, D., and Garofalo, N., A priori estimates and geometric properties of solutions to subelliptic equations in nilpotent Lie groups. Lecture Notes in Pure and Applied Mathematics, vol.194, *Reaction Diffusion Systems,* Marcel Dekker Inc., 89-105, 1998.

12.   Danielli, D., Garofalo, N., and Nhieu, D.M., Trace inequalities for Carnot-Carathéodory spaces and applications. *Annali Scuola Normale Sup. Pisa (4),* 27; 195-252, 1998.

13.   Danielli, D., A Fefferman-Phong type inequality and applications to quasilinear subelliptic equations. *Potential Analysis*, 11 (4); 387-413, 1999.

14.   Danielli, D., Garofalo, N., and Nhieu, D.M., Sub-elliptic Besov spaces and the characterization of traces on lower dimensional manifolds. *Contemporary Mathematics,* vol. 277, Amer. Math. Soc., 19-37, 2001.

15.   Danielli, D., and Garofalo, N., Properties of entire solutions of non-uniformly elliptic equations arising in geometry and in phase transitions. *Calculus of Variations*, 15(4); 451-491, 2002.

16.   Danielli, D., Garofalo, N., and Salsa, S., Variational inequalities with lack of ellipticity. Part I: interior regularity and non-degeneracy of the free boundary. *Indiana Univ. Math. Jour.*, 52; 361-398, 2003.

17.   Danielli, D., Petrosyan, A., and Shahgholian, H., A singular perturbation problem for the p-Laplace operator. *Indiana Univ. Math. Jour.*, 52; 457-476, 2003.

18.   Danielli, D., Garofalo, N., and Nhieu, D.M., On the best possible character of the L^Q norm in some a priori estimates for non-divergence form equations in Carnot groups. *Proc. Amer. Math. Soc.*, 131; 3487-3498, 2003.

19.   Danielli, D., Garofalo, N., and Nhieu, D.M., Notions of convexity in Carnot groups. C*omm. Anal. Geom.*, 11(2); 263-341, 2003.

20.   Danielli, D., Garofalo, N., Nhieu, D.M., and Tournier, F., The theorem of Busemann-Feller-Alexandrov in Carnot groups. *Comm. Anal. Geom.,* 12 (4); 853-886, 2004.

21.   Danielli, D., and Petrosyan, A., A minimum problem with free boundary for a degenerate quasilinear operator. *Calc. of Var. PDE*, 23 (1); 97-124, 2005.

22.   Danielli, D., and Korten, M., On the pointwise jump condition at the free boundary in the 1-phase Stefan problem. *Comm. Pure Appl. Anal.*, 4 (2); 357-366, 2005.

23.   Danielli D., Garofalo N., and Nhieu, D. M., Non-doubling Ahlfors measures, perimeter measures, and the characterization of the trace spaces of Sobolev functions in Carnot-Carathéodory spaces. *Memoirs Amer. Math. Soc.* 182 (857), 2006.

24.   Danielli, D., and Petrosyan, A., Full regularity of the free boundary in a Bernoulli-type problem in two dimensions. *Math. Res. Lett.,* 13 (4), 667-681, 2006.

25.   Danielli, D., Garofalo, N., and Petrosyan, A., The sub-elliptic obstacle problem: $C^{1,\alpha}$ regularity of the free boundary in Carnot groups of step two. *Adv. Math.,* 211(2), 485-516, 2007.

26.   Capogna, L., Danielli, D., Pauls, S., and Tyson, J., An introduction to the Heisenberg Group and the sub-Riemannian isoperimetric inequality. Progress in Mathematics, 259. Birkhäuser Verlag, Basel, 2007. xvi+223 pp. ISBN: 978-3-7643-8132-5.

27.   Danielli, D. (Editor), Recent Developments in Nonlinear Partial Differential Equations. *Contemporary Mathematics,* Amer. Math. Soc., 2007, 133 pp. ISBN: 978-0-8218-3740-5.

28.   Danielli, D., Garofalo, N., and Nhieu, D.M, Sub-Riemannian Calculus on Hypersurfaces in Carnot Groups. *Adv. in Math.,* 215, 292-378, 2007.

29.   Danielli, D., Garofalo, N., and Nhieu, D. M., A partial solution of the isoperimetric problem in the Heisenberg group. *Forum Mathematicum*, 20 (1), 99-143, 2008.

30.   Danielli, D., Garofalo, N., and Nhieu, D.M., A notable family of entire intrinsic minimal graphs in the Heisenberg group which are not perimeter minimizing. *Amer. Jour. Math.,* 130 (2), 317-339, 2008.

PUBLICATIONS (cont.)

31. Danielli, D., and Garofalo, N., Interior Cauchy-Schauder estimates for the heat flow in Carnot-Carathéodory spaces. *Methods Appl. Anal*., 15 (1) (Special issue dedicated to N. Trudinger), 121-136, 2008.
32. Danielli, D., Garofalo, N., Nhieu, D.M, and Pauls, S., Instability of graphical strips and a positive answer to the Bernstein problem in the Heisenberg group. *Jour. Diff. Geom.,* 81 (2), 251-296, 2009.
33. Danielli, D., Garofalo, N., and Nguyen, P. C, Inequalities of Hardy-Sobolev Type in Carnot-Carathéodory Spaces. *Sobolev Spaces in Mathematics I* (V. Maz'ya ed.), International Mathematical Series, Vol. 8, Springer, 117-152, 2009.
34. Danielli, D., Garofalo, N., and Marola, N., Local behavior of p-harmonic Green's functions in metric spaces. *Potential Analysis,* 32 (4), 343-362, 2010.
35. Danielli, D., Garofalo, N., and Nhieu, D. M., Sub-Riemannian calculus and monotonicity of the perimeter for graphical strips. *Math. Zeit*., 265 (3), 617-637, 2010.
36. Danielli, D., Garofalo, N., Nhieu, D.M, and Pauls, S., Stable complete embedded minimal surfaces in $\mathbf{H}^1$ with empty characteristic locus are vertical planes. *Indiana Math. Jour.,* 59 (2), 563-594, 2010.
37. Danielli, D., Garofalo, N., and Nguyen, P. C., Sharp Hardy-Sobolev type inequalities in Carnot-Carathéodory spaces. *Potential Analysis*, 34 (3), 223-242, 2011.
38. Danielli, D., Garofalo, N., and Nhieu, D.M., Integrability of the sub-Riemannian mean curvature of surfaces in the Heisenberg group. *Proc. Amer. Math. Soc.,* 140, 811-821, 2012.
39. Danielli, D., Garofalo, N., Petrosyan, A., and To, T., Optimal regularity and the free boundary in the parabolic Signorini problem. *Memoirs AMS*., 249 (1181), 103 p., 2017.
40. Danielli, D. and Salsa, S., Obstacle problems involving the fractional Laplacian. *Recent developments in the Nonlocal Theory* (T. Kuusi and G. Palatucci, Eds.), Book Series on Measure Theory, De Gruyter, Berlin, 81-164, 2018.
41. Danielli, D., Petrosyan, A., and Pop, C., Obstacle problems for nonlocal operators. *AMS Contemporary Mathematics*, 723, Amer. Math Soc., Providence, RI, 2019.
42. Danielli, D., Petrosyan, A., and Pop, C. (Editors), Proceedings of the AMS Special Session on New Developments in the Analysis of Nonlocal Operators, *AMS Contemporary Mathematics,* 723, Amer. Math Soc., Providence, RI, 2019.

In-Press

43. Danielli, D., Petrosyan, A., and Pop, C., Obstacle problems for nonlocal operators: A brief overview, 11 pages. *Proceedings of the Fourth ISNPS Conference*, Springer, to appear. arXiv:1807.10910
44. Banerjee A., Danielli, D., Garofalo, N., and Petrosyan, A., The regular free boundary in the thin obstacle problem for degenerate parabolic equations, 31 pages. *St. Petersburg Math. Jour.*, 32 (2), 2020. arXiv:1906.06885

Preprints

45. Banerjee A., Danielli, D., Garofalo, N., and Petrosyan, A., The structure of the singular set in the thin obstacle problem for degenerate parabolic equations, 49 pages. Submitted for publication. arXiv:1902.07457
46. Danielli, D. and Jain, R., Regularity results for a penalized boundary obstacle problem, 23 pages. Submitted for publication. arXiv:2003.00995

PUBLICATIONS (cont.)

Non-refereed publications

47. Danielli, D., Garofalo, N., and Nhieu, D.M., Isoperimetric and trace inequalities with respect to Carnot-Carathéodory metrics. *Geometry Seminars,* 1996-97, Univ. of Bologna, Bologna, 51-62, 1998.

Other publications

48. Alvarado, A., Danielli, D., Davis, R., Evans, Z., and Goins, E.H., Difficult Dialogues in the Midwest: A Retrospective on the Impact of EDGE at Purdue University, *A Celebration of the EDGE Program's Impact on the Mathematics Community and Beyond,* Springer, to appear.

In Preparation

49. Danielli, D., Garofalo, N., Munive, I., and Nhieu, D. M., The Neumann problem in the Heisenberg group.
50. Danielli, D., A singular perturbation approach to a parabolic free boundary problem with variable coefficients.
51. Andersson, J., Danielli, D., and Shahgholian, H., Analysis of branch points in a singular perturbation problem.
52. Danielli, D., and Krummel, B. Existence and regularity for the penalized obstacle problem with variable coefficients.
53. Danielli, D., and Ognibene, R., On a two-phase obstacle problem for the fractional Laplacian.

COLLOQUIA AND INVITED LECTURES AT MEETINGS

1. "Boundary regularity in the Dirichlet problem for nonlinear subelliptic equations," meeting on Partial Differential Equations, organizers E. Lanconelli and G. Talenti, Bologna, Italy, June 1994.
2. "Capacitary estimates and the local behavior of solutions of nonlinear sub-elliptic equations," meeting "Harmonic Analysis and its Applications," I.S.I. Guccia, Palermo, Italy, December 1994.
3. "Interior and boundary regularity for solutions of nonlinear subelliptic equations and capacitary estimates," meeting on Partial Differential Equations of Elliptic Type, Cortona, Italy, May 1996.
4. "A Fefferman-Phong type inequality and applications," meeting on Partial Differential Equations of Elliptic Type, Cortona, Italy, May 1996.
5. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation," Colloquium, Purdue University, January 1999.
6. "Singular perturbations of a parabolic free boundary problem arising in combustion theory," meeting "Geometry and regularity of free boundaries," Royal Institute of Technology, Stockholm, Sweden, February 2000.
7. "A singular perturbation problem for the p-Laplace operator: Uniform estimates and limits," Colloquium, Kansas State University, October 2000.
8. "The subelliptic obstacle problem," AMS Sectional Meeting, Lawrence, Kansas, March 2001.
9. "Non-doubling Ahlfors measures, perimeter measures, and the characterization of the trace spaces of Sobolev functions in Carnot-Caratheodory spaces," 49th Midwest PDE Seminar (Conference in honor of D. Adams, J. Lewis, and R. Gariepy), Lexington, Kentucky, March 2002.

COLLOQUIA AND INVITED LECTURES AT MEETINGS (cont.)

10. "The theorem of Busemann-Feller-Alexandrov in Carnot groups," Colloquium, Kansas State University, October 2003.
11. "Variational Inequalities and free boundaries for quasilinear operators," Colloquium, University of Missouri at Columbia, April 2004.
12. "The Theorem of Busemann-Feller-Alexandrov on Carnot Groups," The 2nd Chicago area PDE seminar, University of Chicago, May 2004.
13. "Variational inequalities and free boundaries for the p-Laplace operator," International Conference on Harmonic Analysis and Partial Differential Equations in honor of Carlos E. Kenig, University of Chicago, Illinois, September 2004.
14. "Hypersurfaces of minimal type in sub-Riemannian geometry," Seventh New Mexico Analysis Seminar, University of New Mexico, October 2004.
15. "Variational inequalities and free boundaries for the p-Laplace operator," AMS Sectional Meeting, Albuquerque, New Mexico, October 2004.
16. "A Partial Solution of the Isoperimetric Problem for the Heisenberg Group," AMS Sectional Meeting, Notre Dame, Indiana, April 2006.
17. "Instability of graphical strips and a positive answer to the Bernstein problem in the Heisenberg group H^1," AIMS Sixth International Conference on Dynamical Systems, Differential Equations and Applications, University of Poitiers, France, June 2006.
18. "The sub-elliptic obstacle problem: $C^{1,\alpha}$ regularity of the free boundary in Carnot groups of step two," 6th International Congress on Industrial and Applied Mathematics, ETH, Zurich, July 2007.
19. "Optimal Regularity and the Free Boundary in the Parabolic Signorini Problem", Connections for Women: Free Boundary Problems, Theory and Applications, MSRI, January 2010.
20. "Make a Difference", Science Women for Purdue Event, Purdue University, March 2011.
21. "Optimal Regularity and the Free Boundary in the Parabolic Signorini Problem", International Conference: Recent Development on L^∞-Variational Problems and Associated Nonlinear Partial Differential Equations, University of Kentucky, Lexington, Kentucky, May 2011.
22. "Analytic and geometric properties of some variational inequalities and PDEs", Colloquium, Worcester Polytechnic Institute, January 2013.
23. "Frequency functions, monotonicity formulas, and the thin obstacle problem", Career Options for Women in Mathematical Sciences, IMA, March 2013.
24. "Optimal Regularity and the Free Boundary in the Parabolic Signorini Problem", Colloquium, Rutgers University, October 2013.
25. "Optimal Regularity and the Free Boundary in the Parabolic Signorini Problem", AMS Sectional Meeting, Temple University, October 2013.
26. "Optimal Regularity and the Free Boundary in the Parabolic Signorini Problem", International Conference on Free Boundary Problems: Theory and Applications, Isaac Newton Institute, June 2014.
27. "Frequency Functions, Monotonicity Formulas, and the Free Boundary in the Thin Obstacle Problem", X Americas Conference on Differential Equations and Nonlinear Analysis, University of Buenos Aires, February 2015.
28. "Regularity Results in a Class of Permeability Problems", Workshop for Women in Analysis and PDEs, IMA, May 2015.
29. "Regularity Results in a Class of Permeability Problems", *Women in Math Day,* Bradley University, Sept. 2015.
30. "Regularity Results for a Penalized Boundary Obstacle Problem", AMS Sectional Meeting, Indiana University, April 2017.
31. "Regularity Results for a Penalized Boundary Obstacle Problem", AMS Sectional Meeting, Hunter College, May 2017.
32. "Boundary Obstacle Problems in the Applied Sciences", Colloquium, Temple University, April 2018.

COLLOQUIA AND INVITED LECTURES AT MEETINGS (cont.)

33. "Regularity Results for a Penalized Boundary Obstacle Problem", AMS Sectional Meeting, Northeastern University, April 2018.
34. "Obstacle problems for a class of nonlocal operators arising in mathematical finance", Conference of the International Society for Nonparametric Statistics, Salerno, Italy, June 2018.
35. "The obstacle problem for the fractional heat equation: properties of the free boundary", Joint Mathematics Meeting, Baltimore, Maryland, January 2019.
36. "The obstacle problem for the fractional heat equation: properties of the free boundary", AMS Sectional Meeting, University of Connecticut, April 2019.
37. "The obstacle problem for the fractional heat equation: properties of the free boundary", Workshop on Free Boundary Problems, Columbia University, May 2019.
38. "The obstacle problem for the fractional heat equation: properties of the free boundary", Three Days on Evolution PDEs, Agropoli, June 2019.
39. "The obstacle problem for the fractional heat equation: properties of the free boundary", ICIAM 2019, Valencia, Spain, July 2019.
40. "Monotonicity formulas and boundary obstacles problem", Midwest Geometry Conference, Iowa State University, September 2019.
41. "The obstacle problem for the fractional heat equation", AMS Sectional Meeting, University of Wisconsin, September 2019.
42. "Monotonicity formulas and fractional obstacle problems", Distinguished Women in Mathematics Lecture Series, University of Texas at Austin, February 2020.

INDIVIDUAL INVITED LECTURES

1. "The local behavior of solutions of nonlinear subelliptic equations", Seminar in Analysis, organizer B. Pini, Bologna, Italy, July 1994.
2. "A Fefferman-Phong type inequality and applications to quasilinear subelliptic equations", University of Bologna, Italy, June 1996.
3. "Trace inequalities of Fefferman-Phong type and applications", Royal Institute of Technology, Stockholm, Sweden, June 1997.
4. "A two phase parabolic free boundary problem arising in flame propagation: Uniform estimates and limit", Purdue University, September 1997.
5.   "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", Brown University, February 1999.
6. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", University of Pittsburgh, February 1999.
7. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", Texas A&M University, February 1999.
8. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", Johns Hopkins University, February 1999.
9. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", University of Arkansas, February 1999.
10. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", Georgia Institute of Technology, February 1999.
11. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", University of Texas at Austin, April 1999.
12. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", Ohio State University, June 1999.
13. "Singular perturbations of a two phase parabolic free boundary problem: Uniform estimates and limits", Polytechnic of Milan, July 1999.

INDIVIDUAL INVITED LECTURES (cont.)

14. "Singular perturbations of a two phase parabolic free boundary problem: Uniform estimates and limits", University of Bari, July 1999.
15. "A singular perturbation approach to a two phase parabolic free boundary problem arising in flame propagation", University of Pennsylvania, October 1999.
16. "Singular perturbations of a parabolic free boundary problem arising in flame propagation", University of Maryland, December 1999.
17. "Singular perturbations of a parabolic free boundary problem arising in combustion theory", Linköping University, Sweden, March 2000.
18. "Optimal regularity in the subelliptic obstacle problem", Institut Mittag-Leffler, Stockholm, Sweden, April 2000.
19. "Singular perturbation problems arising in combustion theory", Notre Dame University, October 2000.
20. "Variational inequalities with lack of ellipticity", Purdue University, August 2001.
21. "The method of moving spheres for elliptic Weingarten surfaces", Purdue University, September 2002.
22. "The method of moving spheres for elliptic Weingarten surfaces", University of Texas at Austin, April 2003.
23. "The isoperimetric inequality", Dean's Freshman Honors Seminar, Purdue University, April 2003.
24. "An introduction to partial differential equations", Liftoff Seminar, Purdue University, October 2003.
25. "A Partial Solution of the Isoperimetric Problem for the Heisenberg Group", University of Virginia, February 2006.
26. "A Partial Solution of the Isoperimetric Problem for the Heisenberg Group", University of California at Los Angeles, March 2006.
27. "Instability of graphical strips and a positive answer to the Bernstein problem in the Heisenberg group", Johns Hopkins University, March 2007.
28. "Minimal Surfaces in the Heisenberg Group", Purdue University, October 2007.
29. "Partial Differential Equations: Real Analysis (and more!) at work", Bridge to Research Seminar, Purdue University, April 2010.
30. "A sampler of free boundary problems: the interplay between PDEs and the Calculus of Variations", Bridge to Research Seminar, Purdue University, October 2011.
31. "Optimal Regularity and the Free Boundary in the Parabolic Signorini Problem", Purdue University, February 2012.
32. "Free Boundary Regularity in the Parabolic Signorini Problem", Isaac Newton Institute, April 2014.
33. "Frequency Functions, Monotonicity Formulas, and the Thin Obstacle Problem", Oxford University, May 2014.
34. "Frequency Functions, Monotonicity Formulas, and the Free Boundary in the Thin Obstacle Problem", University of Bergen, May 2014.
35. "Frequency Functions, Monotonicity Formulas, and the Thin Obstacle Problem", Johns Hopkins University, December 2014.
36. "Frequency Functions, Monotonicity Formulas, and the Parabolic Signorini Problem", MIT, March 2015.
37. "Frequency Functions, Monotonicity Formulas, and the Parabolic Signorini Problem", Brown University, March 2015.
38. "Frequency Functions, Monotonicity Formulas, and the Parabolic Signorini Problem", Columbia University, April 2015.
39. "Regularity Results for a Class of Permeability Problems", University of Texas at Austin, May 2015.
40. "Regularity Results for a Class of Permeability Problems", Polytechnic of Milan, June 2015.

INDIVIDUAL INVITED LECTURES (cont.)

41. "Regularity Results for a Class of Permeability Problems", University of Modena and Reggio Emilia, July 2015.
42. "Regularity Results for a Penalized Boundary Obstacle Problem", University of Minnesota, November 2017.
43. "Regularity Results for a Penalized Boundary Obstacle Problem", University of Chicago, October 2018.
44. "Partial Differential Equations: Calculus (and more!) at work", AWM Seminar, Washington University, November 2018.
45. "Monotonicity formulas and boundary obstacles problem", University of Milan-Bicocca, November 2019.
46. "Regularity results for a class of penalized boundary obstacle problems", University of Texas at Austin, February 2020.

TEACHING

Undergraduate Courses:
  o Differential Equations and Linear Algebra – MA 26200
  o Calculus and Analytic Geometry II – MA 16200
  o Multivariable Calculus – MA 17300
  o Several Variable Calculus-Honors - MA 27101H

Graduate Courses:
  o Principles of Real Analysis – MA 50400
  o Real Analysis and Measure Theory – MA 54400
  o Convexity and Optimization – MA 52100
  o Methods of Applied Mathematics – MA 61100
  o Introduction to PDEs – MA 52300
  o Elliptic PDEs of Second Order – MA 64200
  o Methods of Linear and Nonlinear PDEs – MA 64300
  o Optimal Control Theory – MA 62000
  o Calculus of Variations – MA 64400
  o Topics in Potential Theory – MA 69000
  o Geometric Measure Theory – MA 59800
  o Introduction to Minimal Surfaces – MA 69000

Student evaluations in the past five years (Scores on a 1-5 point scale with 5 being highest)

Sem	Course Number	# Responses/ # Enrolled	Course Evaluation Score	Instructor Evaluation Score
Spring 2015	MA 26200	17/39	4.3	4.7
Spring 2015	MA 64400	3/10	3.8	4.3
Fall 2015	MA 27101H	26/40	4.7	4.8
Fall 2015	MA 27101H	28/39	4.9	4.9
Spring 2016	MA 54400	17/22	4.8	4.6
Fall 2016	MA 27101H	22/35	4.7	4.9
Fall 2016	MA 61100	4/10	4.8	4.8
Spring 2017	MA 16200	55/108	4.0	4.2
Spring 2017	MA 16200	55/109	3.9	4.1

Spring 2017	MA 26200	32/60	3.9	4.3
Fall 2017	MA 26200	45/74	3.7	4.6
Fall 2017	MA 64200	8/13	4.8	4.8
Spring 2018	MA 64300	3/6	4.8	4.8
Fall 2018	MA 26200	31/64	4.1	4.9
Spring 2019	MA 64400	4/11	4.8	4.5

PROFESSIONAL SERVICE

Departmental Service:

Elementary Services Committee (2005-06)
Promotion Sub-Committee (2008-09, 2017-19)
Graduate Committee (2008-2013)
Teaching Load Committee (2007-09)
Special Qualifying Exams Committee (2008-09)
Personnel Committee (2009-2013, 2015-18, 2019-20)
Head Search Committee (2006-07, 2010-11, 2012-13, 2019-20)
Ad hoc committee for University Faculty Scholar (2016)
Awards Committee (2016-)
Diversity Committee (2017-)
Graduate Mentoring Program Manager (2017-)
Review Committee for CCAM Director (2018-19)

College and University Service:

Clare Boothe Luce Fellows Program Committee (2006-08, 2017-18)
Strategic Planning Oversight Committee (2009-10)
Ad Hoc Steering Committee on Core Curriculum (2009-10)
Grievance Hearing Committee (2006-08, 2010-12)
University Promotion Committee (2011-13, 2017-20)
University Grade Appeal Committee (2012-15)
Advisory Committee on Equity (2013-16)
Censure and Dismissal Committee (2013-16, 2018-21)
CoS Area Promotion Committee (2015-17)
Architectural and Landscape Planning Committee (2016-21)
CoS Faculty Council (2019-21)

CONFERENCE ORGANIZATION

❖ AMS – UMI First Joint International Meeting, Pisa, Italy, June 2002, Special Session Co-organizer.
❖ Symposium on Analysis and PDEs, Purdue University, May 2003 and June 2004, Creator and Organizer; May 2007, May 2009, May 2012, June 2015, June 2021, Co-organizer.
❖ 72nd Midwest PDE Seminar, Purdue University, Fall 2013, Co-organizer.
❖ AMS Sectional Meeting, University of St. Thomas, October 2016, Special Session Co-organizer.
❖ Midwest Women in Mathematics Symposium, Purdue University, April 2018, Co-organizer.
❖ AMS Sectional Meeting, Northeastern University, April 2018, Special Session Co-organizer.
❖ 82nd Midwest PDE Seminar, Purdue University, October 2018, Co-organizer.
❖ AWM Research Symposium Special Session Organizer, Rice University, April 2019.

CONFERENCE ORGANIZATION (cont.)

- ❖ Women in Analysis - A Research Collaboration Conference for Women, BIRS, Canada, June 2019, Co-organizer.
- ❖ ICIAM 2019, Valencia, Spain, July 2019, Mini-Symposium Co-organizer.
- ❖ AMS Sectional Meeting, Purdue University, April 2020, Local Co-organizer.
- ❖ JMM 2021, Invited Special Session Co-organizer.

OTHER PROFESSIONAL ACTIVITIES

- ❖ Women in Mathematics Day at Purdue, Fall 2007, Creator and Organizer; Fall 2008-2018, Co-organizer.
- ❖ Graduate Research Days at Purdue, Spring 2013-2014 and Fall 2016-18, Creator and Co-organizer.
- ❖ Faculty mentor for the Association for Women in Mathematics network (2008-present).
- ❖ Faculty mentor for Horizons Student Support Services (2009-present).
- ❖ Indiana Mentoring Cluster Leader for the Enhancing Diversity in Graduate Education program (2005-2012).
- ❖ Local site organizer for the Indiana State Mathematics Contest (2010-13, 2015).
- ❖ Faculty sponsor of the Student Chapter of the AWM at Purdue University (2011-present).
- ❖ AWM Ruth Michler Prize Committee, Member (2012-15).
- ❖ Program on Free Boundary Problems and Related Topics, Isaac Newton Institute (Cambridge, UK), Spring 2014, Seminar Co-organizer.
- ❖ Faculty mentor for the National Alliance for Doctoral Studies in the Mathematical Sciences (2014-present).
- ❖ AMS Committee on Women, Member (2018-19) and co-Chair (2019-20).
- ❖ AMS Stefan Bergman Trust Fund Committee, Member (2018-21).
- ❖ AWM Mentoring Travel Grant Selection Committee, Member (2018-21).
- ❖ AWM JMM Committee, Member (2019-21).
- ❖ NSF Review Panel and Site Visit Member.
- ❖ Reviewer for the Simons Foundation.
- ❖ Reviewer for the Italian Ministry of Education, University and Education.
- ❖ Reviewer for the Canada Council for the Arts.
- ❖ Reviewer for the European Science Foundation.
- ❖ Referee for: Birkhauser, Springer, *Jour. Diff. Eq., Comm. P.D.E., Jour. Math. Anal. Appl., SIAM Jour. Math. Anal., Math. Ann., Journal London Math. Soc., Trans. A.M.S., Proc. A.M.S., Potential Analysis, Adv. Math., Annals Math., Memoirs A.M.S., Interfaces and Free Boundaries, Math. Nachr., Proc. Royal Soc. Ed., Electronic Jour. Diff. Eq., Jour. Geom. Anal., Math. Zeit., Pacific Jour. Math., Calc. of Variations and PDEs, Revista Matematica Iberoamericana, Geom. and Funct. Anal., Journal Funct. Anal.*