DEJAN SLEPČEV

Department of Mathematical Sciences
Carnegie Mellon University
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EDUCATION

Ph.D. Mathematics   2002
University of Texas at Austin
Advisor: P. E. Souganidis

M.A. Mathematics   2000
University of Wisconsin at Madison

B.Sc. Mathematics   1995
University of Novi Sad

EMPLOYMENT

Carnegie Mellon University
Associate Dean of Mellon College of Science	2023 - present
Professor	2017 - present
Associate Professor	2011 - 2017
Assistant Professor	2006 - 2011

University of California at Los Angeles   2004 - 2006
Assistant Adjunct Professor and Assistant Researcher

University of Toronto   2002 - 2004
Postdoctoral Fellow

EDITORIAL ACTIVITIES

Member of Editorial Board of the Journal of Nonlinear Science	2016-present
Member of Editorial Board of the Nonlinear Analysis	2020-present
Member of Editorial Board of the SIAM Journal on Mathematical Analysis	2022-present

PUBLICATIONS

1. Y. Lu, D. Slepčev, L. Wang *Birth–death dynamics for sampling: global convergence, approximations and their asymptotics* Nonlinearity 36 (11), (2024).
2. R. Han, D. Slepčev, Y. Yang, *HV Geometry for signal comparison*, Quart. Appl. Math. 82 (2024) pp. 391-430.
3. D. Slepčev, A. Warren, *Nonlocal Wasserstein distance: Metric and asymptotic prop-*

erties, Calc. Var. and PDE 62(238), (2024) pp. 1-66.

4. J. Calder, D. Slepčev, M. Thorpe *Rates of convergence for Laplacian semi-supervised learning with low labeling rates* Research in Mathematical Sciences 10, (2023) pp. 1-42.

5. J. Calder, S. Park, D. Slepčev, *Boundary estimation from point clouds: Algorithms, guarantees and applications*, Journal of Scientific Computing 92 no. 2, (2022), pp. 1-59.

6. L. Xu, A. Korba, D. Slepčev, *Accurate quantization of measures via interacting particle-based optimization*, International Conference on Machine Learning, (2022) pp. 24576-24595.

7. K. Craig, N. Garcia-Trillos, D. Slepčev, *Clustering dynamics on graphs: from spectral clustering to mean shift through Fokker–Planck interpolation* in Active Particles, Volume 3, Springer Verlag (2022), pp. 105-151.

8. F. Patacchini, D. Slepčev, *The nonlocal-interaction equation near attracting manifolds* Discrete & Continuous Dynamical Systems 42, no. 2 (2021) pp. 903-929.

9. A. Esposito, F.S. Patacchini, A. Schlichting, D. Slepčev, *Nonlocal-interaction equation on graphs: gradient flow structure and continuum limit*, Archive for Rational Mechanics and Analysis 240 no. 2, (2021) pp. 699-760.

10. X.Y. Lu and D. Slepčev, *Average-distance problem with curvature penalization for data parameterization: regularity of minimizers*, ESAIM: Control, Optimisation and Calculus of Variations 27 no. 8, (2021) pp. 1-25.

11. M. Caroccia, A. Chambolle, D. Slepčev, *Mumford − Shah functionals on graphs and their asymptotics* Nonlinearity 33 no. 8, (2020) pp. 3846–3888.

12. J. Calder, D. Slepčev, *Properly-weighted graph Laplacian for semi-supervised learning*, Applied Mathematics and Optimization, (2019) pp. 1-49.

13. Y. Soliman, D. Slepčev, K. Crane, *Optimal cone singularities for conformal flattening*, ACM Trans. Graph. 37 no.4, (2018), pp. 105:1–105:17.

14. M.M. Dunlop, D. Slepčev, A.M. Stuart, M. Thorpe, *Large data and zero noise limits of graph-based semi-supervised learning algorithms*, Appl. Comput. Harmon. Anal., 49, no. 2, (2020), pp. 655 - 697.

15. N. García Trillos, M. Gerlach, M. Hein, D. Slepčev, *Error estimates for spectral convergence of the graph Laplacian on random geometric graphs towards the Laplace-Beltrami operator*, Found. Comput. Math., (2019) pp. 1-61.

16. M. Thorpe, D. Slepčev, *Analysis of p-Laplacian regularization in semi-supervised learning*, SIAM J. Math. Anal., 51, no. 3, (2019) pp. 2085-2120.

17. M. Thorpe, S. Park, S. Kolohuri, G. Rohde, D. Slepčev, *A transportation L^p distance for signal analysis*, J. Math. Imaging Vision 59, no. 2, (2017), pp. 187-210.

18. S. Kolohuri, S. Park, M. Thorpe, D. Slepčev, G. Rohde, *Optimal Mass Transport: Signal processing and machine-learning applications*, IEEE Signal Processing Magazine 34 no. 4, (2017) pp. 43-59.

19. J-G. Liu, R.L. Pego, D. Slepčev, *Least action principles for incompressible flows and optimal transport between shapes*, Calc. Var. Partial Differential Equations, available online, (2019), pp. 58-179.

20. N. García Trillos, D. Slepčev, J. von Brecht, *Estimating perimeter using graph cuts*, to appear in Advances in Applied Probability, Advances in Applied Probability 49 no. 4, (2017), pp. 1067-1090.

21. S. Kirov, D. Slepčev, *Multiple penalized principal curves: analysis and computation*, J. Math. Imaging Vision 59, no. 2, (2017), pp. 234-256.

22. N. García Trillos, D. Slepčev, *A variational approach to the consistency of spectral clustering*, Appl. Comput. Harmon. Anal. 45, no. 2, (2018), pp. 239-281.

23. N. García Trillos, D. Slepčev, J. von Brecht, T. Laurent, and X. Bresson, *Consistency of Cheeger and ratio graph cuts*, J. Mach. Learn. Res. 17, no. 181, (2016), pp. 1-46.

24. X.Y. Lu and D. Slepčev, *Average distance problem for parameterized curves*, ESAIM Control Optim. Calc. Var. 22, no. 2 (2016), pp. 404-416.

25. N. García Trillos and D. Slepčev, *Continuum limit of total variation on point clouds*, Arch. Ration. Mech. Anal., 220 no. 1, (2016) 193-241.

26. N. García Trillos and D. Slepčev, *On the rate of convergence of empirical measures in ∞-transportation distance*, Canad. J. Math, 67, (2015), pp. 1358-1383.

27. R. Simione, D. Slepčev, I. Topaloglu, *Existence of ground states of nonlocal interaction energies*, J. Stat. Phys. 159, No. 4 (2015), pp. 972-986.

28. J.A. Carrliio, D. Slepčev, L. Wu, *Nonlocal-interaction equations on uniformly prox-regular sets*, Discrete Contin. Dyn. Syst. Vol. 36, no. 3, (2016), pp. 1209 - 1247.

29. L. Wu and D. Slepčev, *Nonlocal interaction equations in environments with heterogeneities and boundaries*, Commun. Partial Differential Equation, vol. 40, no. 7, (2015), pp. 1241-1281.

30. M. Elsey and D. Slepčev, *Mean-curvature flow of Voronoi diagrams*, J. Nonlin. Science, 25 No. 1 (2015), pp 59-85.

31. X.Y. Lu and D. Slepčev, *Properties of minimizers of average-distance problem via discrete approximation of measures*, SIAM J. Math. Anal., 45, No. 5, (2013) pp. 3114-3131.

32. D. Slepčev, *Counterexample to regularity in average-distance problem*, Ann. Inst. H. Poincare Anal. Non Lineaire, 31, (2014), pp. 169-184.

33. W. Wang, D. Slepčev, S. Basu, J. Ozolek, and G.K. Rohde, *A linear optimal transportation framework for quantifying and visualizing variations in sets of images*, International Journal of Computer Vision, 101, No. 2, (2013), pp. 254-269.

34. F. Otto, C. Seis, and D. Slepčev, *Crossover of the coarsening rates in demixing of binary viscous liquids*, Commun. Math. Sci.,11, No. 2, (2013), pp. 441-464 .

35. J.A. Carrillo, M. Di Francesco, A. Figalli, T. Laurent, and D. Slepčev, *Confinement in nonlocal interaction equations*, Nonlinear Anal. 75 (2012), pp. 550-558.

36. J.A. Carrillo, M. Di Francesco, A. Figalli, T. Laurent, and D. Slepčev, *Global-in-time weak measure solutions, and finite-time aggregation for nonlocal interaction equations*, Duke Math J. 156 No 2, (2011) pp. 229–271.

37. W. Wang, J. Ozolek, D. Slepčev, A. Lee, C. Chen, G.K. Rohde *An optimal transportation approach for nuclear structure-based pathology*, IEEE Trans. Med. Imaging, 99 (2010).

38. A. Bertozzi and D. Slepčev, *Existence and uniqueness of solutions to an aggregation equation with degenerate diffusion*, Commun. Pure Appl. Anal. 9 No. 6 (2010) pp. 1617-1637.

39. J.A. Carrillo, S. Lisini, G. Savaré, and D. Slepčev, *Nonlinear mobility continuity equations and generalized displacement convexity*, J. Funct. Anal. 258, No. 4, (2010) pp. 1273-1309.

40. D. Slepčev, *Linear stability of selfsimilar solutions of unstable thin-film equations*, Interfaces Free Bound. 11, No. 3, (2009) pp. 375-398.

41. J.A. Carrillo and D. Slepčev, *Example of a displacement convex functional of first order*, Calc. Var. Partial Differential Equations, 36, No. 4 (2009) pp. 547-564.

42. K. Glasner, F. Otto, T. Rump, and D. Slepčev, *Ostwald ripening of droplets: the role of migration* European J. Appl. Math. 20, No. 1, (2009) pp. 1-67.

43. D. Slepčev, *Coarsening in nonlocal interfacial systems* SIAM J. Math. Anal. 40, No. 3, (2008) pp. 1029-1048.

44. S. Esedoglu and D. Slepčev, *Refined upper bounds on the coarsening rate of discrete, ill-posed diffusion equations*, Nonlinearity 21 (2008) pp. 2759-2776.

45. F. Otto, T. Rump, and D. Slepčev, *Coarsening rates for a droplet model: rigorous upper bounds*, SIAM J. Math. Anal. 38 (2006) no. 2, pp. 503-529.

46. R.J. McCann and D. Slepčev, *Second-order asymptotics for the fast-diffusion equation* Int. Math. Res. Not. (2006) article ID 24947, pp. 1-22.

47. D. Slepčev and M.C. Pugh, *Selfsimilar blowup of unstable thin-film equations*, Indiana Univ. Math. J. 54 (2005) no. 6, pp. 1697-1738.

48. F. da Lio, C.I. Kim, and D. Slepčev, *Nonlocal front propagation problems in bounded domains with Neumann-type boundary conditions and applications*, Asymptot. Anal. 37 (2004) no. 3-4, pp. 257-292.

49. D. Slepčev, *On level-set approach to motion of manifolds of arbitrary codimension*, Interfaces Free Bound. 5 (2003) no. 4, pp. 417-458.

50. D. Slepčev, *Approximation schemes for propagation of fronts with nonlocal velocities and Neumann boundary conditions*, Nonlinear Anal. 52 (2003) no. 1, pp. 79-115.

Conference Publications

1. S. Kolohuri, D. Slepčev, G. Rohde, *A Symmetric Deformation-Based Similarity Measure for Shape Analysis*, IEEE 12th International Symposium on Biomedical Imaging (ISBI) 2015.
2. G. K. Rohde, W. Wang, D. Slepčev, A. B. Lee, C. Chen, and J. A. Ozolek, *Detecting and classifying cancers from image data using optimal transportation*, 26th Southern Biomedical Engineering Conference, University of Maryland, 2010.
3. W. Wang, C. Chen, T. Peng, D. Slepčev, J. A. Ozolek, G. K. Rohde, *A graph-based method for detecting characteristic phenotypes from biomedical images.* Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI) 2010, pp. 129-132.

Patents

1. W. Wang, D. Slepčev, G. K. Rohde, *Quantitative Comparison of Image Data Using a Linear Optimal Transportation*, US Patent 9,727,58, 2017.

Funding

- PI of NSF grant DMS-220606, *Novel transportation-based geometries, gradient flows, and applications to data science*, 2022-2025 $378,158.
- PI of NSF grant DMS-1814991 *Variational problems and partial differential equations on discrete random structures: analysis and applications to data science*, 2018-2022, $245,566.
- Co-PI of NSF grant 1601475 *Topics in applied nonlinear analysis: recent advances and new trends*, $31,600.
- PI of NSF grant DMS-1516677 *Variational problems on random structures: analysis and applications to data science*, 2015-2018, $181,107.
- Co-PI of NSF grant CCF-1421502 *Transport and other Lagrangian transforms for signal analysis and discrimination*, 2014-2017, $499,999.
- PI of NSF grant DMS-1211760 *Nonlocal energies and their application to data analysis and collective behavior of many-particle systems* 2012-2015, $132,838.
- Collaborator on NIH grant P41 GM103712-01 *High performance computing for multi-scale modeling of biological systems*, $1,500,000 (per year), 2012-2017.
- Co-PI of ICTI/FCT grant UTA_CMU/MAT/0007/2009 *Degenerate elliptic and parabolic equations and their applications to front propagation* 2011-2014, $200,000.
- PI of NSF grant DMS-0908415 *Energy-driven systems: Geometry of energy landscapes and applications* 2009-2012, $112,290.
- Collaborator on NIH grant 5R21 GM088816-02 *Deformation-based computational morphometry for cell biology applications*, 2009-2011, $225,000.

- PI of NSF grant DMS-0638481 *Dynamics of Unstable Thin Liquid Films and Coarsening*, 2006-2009, $92,746.

INVITED TALKS

- Workshop, Aggregation-diffusion equations and collective behavior: analysis, numerics and applications, CIRM, Marseille, April 2024
- Workshop, Particle systems in dynamics, optimization, and learning, Paris, March 2024
- Workshop, Applications of optimal transportation, Mathematisches Forshungsinstitut Oberwolfach, Germany, February 2024
- Mathematics of Machine Learning Seminar, University of Massachusetts at Amherst, November 2023 (online)
- Analysis Seminar, University of Texas at Austin, November 2023
- SIAM New York-New Jersey-Pennsylvania Section Meeting, October 2023
- Colloquium, Michigan State University, October 2023
- International Congress on Industrial and Applied Mathematics, Mini symposium Geometric methods in machine learning and data analysis, Tokyo, Japan, August 2023
- Workshop, Emerging topics in applications of optimal transport ETH Zurich, June 2023
- Workshop, Nonlinear diffusion and nonlocal interaction models – entropies, complexity, and multi-scale structures, BIRS Granada, Spain, May 2023
- Workshop, Optimal transport, mean-field models, and machine learning TU Munich, April 2023
- Seminar, Max Planck Institute, Leipzig, March 2023
- Reunion workshop of the program on *Geometric Methods in Optimization and Sampling* Simons Institute (UC Berkeley), January 2023
- Applied Mathematics Seminar, Purdue University, November 2022
- Workshop, *Nonlocality in Analysis, Numerics and Applications*, Lorentz Center, Leiden University, October 2022
- CASA Colloquium, TU Eindhoven, October 2022
- *SIAM Conference on Mathematics of Data Science* (Zoom), September 2022
- *KSIAM-MINDS-NIMS International Conference on Machine Learning and PDEs*, Seoul (Zoom), August 2022
- Workshop, *Variational challenges in materials science and imaging*, TU Wien, June 2022
- Workshop, *Synergies between Data Science and PDE Analysis*, Hausdorff Center for Mathematics, Bonn, June 2022
- Summer School *Foundational Methods in Machine Learning*, Hausdorff Center for Mathematics, Bonn, June 2022
- Applied Mathematics Seminar, UC Berkeley, April 2022

- Distinguished *Lions Lectures*, Sorbone University, Paris, November 2021
- Workshop *Dynamics and Discretization: PDEs, Sampling, and Optimization* , Simons Institute (UC Berkeley), October 2021
- Colloquium, Old Dominion University (Zoom), September 2021
- Program on *Geometric Methods in Optimization and Sampling* Boot Camp, Simons Institute (UC Berkeley), September 2021
- CAMP Seminar, University of Chicago (Zoom), February 2021
- Workshop *Mathematics and Image Analysis*, Paris (Zoom), January 2021
- Workshop Hot Topics: Optimal transport and applications to machine learning and statistics, MSRI, May 2020
- Long Program, High Dimensional Hamilton-Jacobi PDEs – Tutorials (IPAM), Los Angeles, March 2020
- Computational and Applied Mathematics Colloquium, Penn State University, February 2020
- Data-Science Seminar, LSU, November 2019
- Workshop: Ki-Net Research Interaction Weekend: Kinetic dynamics, Transport, Networks and application, Richmond, VA, October 2019
- CSCAMM Seminar, University of Maryland, September 2019
- two talks at International Congress on Industrial and Applied Mathematics, Valencia, Spain, July 2019
- Mini-course, *Variational problems on random structures: analysis and applications to data science*, Università di Roma Tor Vergata, Rome, Italy, June 2019
- Workshop, Inverse Problems and Machine Learning, Centre de Recherches Mathématiques (CRM), Montreal, Canada, May 2019
- Workshop, Geometry of Big Data, Institute for Pure and Applied Mathematics (IPAM), Los Angeles, April, 2019
- Midwest PDE Seminar, Indiana University, Bloomington, March 2019
- Applied Math and Comp Sci Colloquium, University of Pennsylvania, March 2019
- Seminar, Drexel University, March 2019
- Workshop, Mathematics, Data Science, and Industry, Purdue University, December 2018
- Workshop, Emergence of Structures in Particle Systems: Mechanics, Analysis and Computation, Mathematisches Forshungsinstitut Oberwolfach, Germany, November 2018
- Workshop, Kinetic dynamics, Transport, Networks and Applications , Charlottesville, October 2018
- Stochastics and Statistics Seminar, MIT, September 2018
- Lecture series at Luis Santaló Summer School Variational problems on random structures: analysis and applications to data science , Santander, Spain, August 2018

- Workshop, Nonlocal differential equations in collective behavior, American Institute of Mathematics, San Jose, CA, June 2018
- IMA Data Science Seminar, University of Minnesota, May 2018
- Workshop, Theory and Foundations of Topological and Geometric Data Analysis , MBI, Ohio State University, May 2018
- Workshop, Numerical Analysis and Approximation Theory meets Data Science , BIRS, Banff, April 2018
- Workshop, Data-Rich Phenomena - Modelling, Analysis and Simulations using Partial Differential equations , Münster, Germany, March 2018
- Workshop, Inverse Problems and Machine Learning , Caltech, February 2018
- Applied Mathematics and PDE Seminars, UC Irvine, October 2017
- *Learning Theory Workshop* at FOCM '17, Barcelona, Spain, July 2017
- Workshop *Emerging PDE Models in Socio-Economic Sciences*, Warwick, UK, May 2017
- Workshop, *Optimal Transport Meets Probability, Statistics and Machine Learning*, Oaxaca, Mexico, April 2017
- Computing + Mathematical Sciences Colloquium, Caltech, February 2017
- Workshop, *Applications of Optimal Transportation in the Natural Sciences*, Mathematisches Forshungsinstitut Oberwolfach, Germany, January 2017
- AMS Sectional Meeting, NC State, November 2016
- Applied Mathematics Seminar, Duke University, November 2016
- Data Analysis Seminar, Johns Hopkins University, November 2016
- Colloquium, University of Arizona, October 2016
- Applied Mathematics Seminar, Courant Institute, September 2016
- Workshop *Computational Optimal Transportation*, Centre de Recherches Mathématiques (CRM), Montreal, Canada, July 2016
- Conference *Calculus of Variations, Optimal Transportation, and Geometric Measure Theory: From Theory to Applications*, Lyon, France, July 2016
- Workshop *Entropy Methods, Dissipative Systems, and Applications*, Vienna, Austria, June 2016
- Lecture Series, *Variational problems on random structures: analysis and applications to data science*, Imperial College, London, May/June 2016
- Workshop, *Young Applied Analysts in the UK*, Bath, UK, May 2016
- PDE Seminar, Georgia Tech, April 2016
- CAMP Seminar, University of Chicago, February 2016.
- Workshop *Data Rich Phenomena - Modelling, Analysing and Simulation using Partial Differential Equations*, Cambridge, December 2015
- SIAM Conference on Analysis of Partial Differential Equations, December 2015

- Workshop, *Collective Dynamics in Biological and Social Systems*, Duke, November 2015
- Colloquium, University of Utah, October 2015
- Dagstuhl Seminar, *Mathematical and Computational Foundations of Learning Theory*, Germany, September 2015
- International Congress on Industrial and Applied Mathematics, Beijing, August 2015
- Conference, *Calculus of Variations and Nonlinear Partial Differential Equations*, Austin, May 2015
- Workshop, *Recent Developments in Continuum Mechanics and PDE*, Lincoln, April 2015
- Topology, Geometry and Data Seminar, Ohio State University, April 2015
- SIAM Conference on Computational Science and Engineering, March 2015
- Workshop, *Gradient Flows and Entropy Methods*, Hausdorff Institute, Bonn, February 2015
- Mini-Workshop, *Discrete p-Laplacians: Spectral Theory and Variational Methods in Mathematics and Computer Science*, Mathematisches Forshungsinstitut Oberwolfach, February 2015
- Workshop, *Variational Methods for Evolution*, Mathematisches Forshungsinstitut Oberwolfach, December, 2014
- Conference, *Entropy and Singular Solutions for Conservation Laws*, West Virginia University, September 2014
- Workshop, *Kinetics, non standard diffusions and stochastics: emerging challenges in the sciences*, Austin, May 2014
- Mini course at workshop *Mathematical biology, particle systems and reaction-diffusion thematic school*, Toulouse, France, March 2014
- LCDS Seminar, Brown University, February 2014
- SIAM Conference on Analysis of Partial Differential Equations, December 2013
- Analysis Seminar, University of Wisconsin, Madison, November 2013
- CSCAMM Seminar, University of Maryland, October 2013
- SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, June 2013
- *5th Symposium on Analysis and PDEs*, Purdue University, May 2012
- Colloquium, University of Utah, April 2012
- Colloquium, University of West Virginia, February 2012
- SIAM Conference on Analysis of Partial Differential Equations, San Diego, November 2011
- XI Praire Analysis Seminar, Kansas State University, October 2011
- Society of Engineering Sciences Technical Meeting, Chicago, October 2011

- Workshop on Pattern Formation and Multiscale Phenomena in Materials, Oxford University (United Kingdom), September 2011
- CASA Colloquium, TU Eindhoven (Netherlands), June 2011
- Analysis and Applied Mathematics Seminar, University of Toronto, November 2010
- Analysis and Applied Mathematics Seminar, University of Michigan, November 2010
- AMS Sectional Meeting, Los Angeles, October 2010
- Applied Analysis Seminar, University of Pittsburgh, September 2010
- Workshop *Phase Transitions*, Mathematisches Forshungsinstitut Oberwolfach, May/June, 2010
- Workshop *Monge-Kantorovich Optimal Transport Theory and Applications*, Santa Fe, October 2009
- Workshop *On Kinetics and Statistical Methods for Complex Particle Systems*, Lisbon (Portugal), July 2009
- CASA Colloquium, TU Eindhoven (Netherlands), June 2009
- Seminar, University of Bonn (Germany), June 2009
- Analysis Seminar, University of Novi Sad (Serbia), June 2009
- Applied Mathematics and Analysis Seminar, Duke University, November 2008
- Conference *Optimal Transportation and Applications*, Pisa (Italy), November 2008
- CAMP / Nonlinear PDEs Seminar, University of Chicago, October 2008
- Workshop: *Geometrical Singularities and Singular Geometries*, Institute for Mathematics and its Applications, Minneapolis, July 2008
- SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, May 2008
- Workshop: *Aspects of Optimal Transport in Geometry and Calculus of Variations*, Institute for Pure and Applied Mathematics (IPAM), Los Angeles, March 2008
- Differential Equations Seminar, Georgia Institute of Technology, March 2008
- Workshop: *New Trends in Calculus of Variations and Mass Transport*, Center for Nonlinear Analysis, Carnegie Mellon University, March 2008
- SIAM Conference on Analysis of Partial Differential Equations, Mesa, December 2007
- Workshop: *Optimal Transportation and Application to Geophysics and Geometry*, International Centre for Mathematical Sciences, Edinburgh (UK), July 2007
- *III Symposium on Analysis and PDEs*, Purdue University, May 2007
- Differential Equations Seminar, University of Michigan, April 2007
- Conference: *Limit Problems in Analysis*, Lorentz Center, Leiden (Netherlands), May 2006
- Workshop: *Nonlinear Diffusions: Entropies, Asymptotic Behaviour, and Applications* Banff International Research Station (Canada), April 2006
- Colloquium, Carnegie Mellon University, February 2006

- NSF Workshop: *Thin Films and Fluid Interfaces*, Institute for Pure and Applied Mathematics (IPAM), Los Angeles, January 2006
- Colloquium, North Carolina State University, January 2006
- PDE Seminar, University of Minnesota, September 2005
- Equadiff 11, Bratislava (Slovakia), July 2005
- SIAM Annual Meeting, New Orleans, July 2005
- SFB Seminar, University of Bonn (Germany), June 2005
- SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2005
- PDE Seminar, Brown University, April 2005
- AMS Sectional Meeting, Bowling Green, March 2005
- SIAM Conference on Analysis of Partial Differential Equations, Houston, December 2004
- AMS Sectional Meeting, Nashville, October 2004
- Seminar, University of Bonn (Germany), June 2004
- PDE Seminar, MIT, April 2004
- Young Mathematicians Conference, University of Toronto, January 2004
- Workshop: *Nonlinear Dynamics of Thin Films and Fluid Interfaces*, Banff International Research Station, November 2003
- Applied Mathematics Seminar, University of Toronto, March 2002
- Workshop: *Viscosity Methods in Partial Differential Equations*, Pacific Institute for Mathematical Sciences, Vancouver, July 2001

INVITED VISITS

- Simons Institute (UC Berkeley), August 25-October 30, 2021
- Institute for Pure and Applied Mathematics (IPAM), April 14-May 2, 2019
- Mathematisches Forshungsinstitut Oberwolfach, October 29- November 2, 2018
- Banff International Research Station, April, 27-27, 2018
- Mathematisches Forshungsinstitut Oberwolfach, November 12-17, 2017
- Mathematisches Forshungsinstitut Oberwolfach, January 30- February 2, 2017
- Imperial College London, May 15-June 3, 2016
- Dagstuhl, August, August 30-September 4, 2015
- Mathematisches Forshungsinstitut Oberwolfach, February 8-14, 2015
- Mathematisches Forshungsinstitut Oberwolfach, December 14-20, 2014
- PCMI Mathematics and Materials Summer Program, July 3-14, 2014
- ICERM, February 9-21, 2014
- Mathematisches Forshungsinstitut Oberwolfach, December 4-10, 2011
- Max Planck Institut Leipzig, June 17-23, 2010

- Mathematisches Forshungsinstitut Oberwolfach, May 30-June 5, 2010
- Autonomous University of Barcelona, June 20-26, 2009
- TU Eindhoven, June 14-20, 2009
- University of Bonn, June 3-14, 2009
- Mathematisches Forshungsinstitut Oberwolfach, July 6-12, 2008
- University of Bonn, July 3-15, 2007
- University of Bonn, July 2-9, 2006
- Banff International Research Station, April, 15-20, 2006
- University of Bonn, June 14-25, 2005
- University of Bonn, June 11-21, 2004
- Banff International Research Station, November 29-December 4, 2003

PROFESSIONAL ACTIVITIES

- Leader of the CMU node within the NoMADS Research Consortium funded by European Union, 2017-2023
- Math in Greater Paris Postdoc Hiring evaluator 2021-2023
- Co-organizer, Workshop, *Variational Methods for Evolution*, Mathematisches Forshungsinstitut Oberwolfach, Germany, December 2023
- NSF Grant Proposal Reviewer 2022
- NSF Panel 2022
- NSF Grant Proposal Reviewer 2021
- NSF Panel 2021
- Co-organizer, Workshop, *Variational Methods for Evolution*, Mathematisches Forshungsinstitut Oberwolfach, Germany, September 2020
- Associate Director of the Center for Nonlinear Analysis (CNA), August 2015-December 2021
- Core faculty of the Ki-Net NSF Research Network, April 2014-2021
- Co-organizer, Long program *Harnessing the Continuum for Big Data: Partial Differential Equations, Calculus of Variations, and Machine Learning*, Fall 2020, IMA, University of Minnesota
- Reviewer of Proposals for Natural Sciences and Engineering Research Council of Canada (NSERC), 2020
- Co-organizer, Workshop *PDE and Inverse Problem Methods in Machine Learning*, IPAM (UCLA) April 2020
- Reviewer of Proposals for Banff International Research Station 2019
- Reviewer of Proposals for Oak Ridge Associated Universities (ORAU) 2019
- SIAM Activity Group on Analysis of Partial Differential Equations, Nominations Committee (Chair), 2019.

- Co-organizer, Workshop *Entropies, the Geometry of Nonlinear Flows, and their Applications*, BIRS, Banff, Canada, April 2018
- University of Münster, Numerical Analysis Hiring evaluator 2018
- Co-organizer, Workshop, *Variational Methods for Evolution*, Mathematisches Forshungsinstitut Oberwolfach, Germany, November 2017
- Member of National Center for Multiscale Modeling of Biological Systems (MMBioS), 2013-2017
- Co-organizer CNA/Ki-Net Workshop, *Dynamics and geometry from high dimensional data*, CMU, March 2017
- NSF Panel Member, 2017
- Vice Chair of the SIAM Activity Group on Analysis of Partial Differential Equations, January 2015 –December 2016.
- NSF Panel Member, 2016
- Co-organizer: CNA conference *Topics in Applied Nonlinear Analysis: Recent Advances and New Trends*, July 2016
- Reviewer for European Research Council Consolidator Grant call, 2015
- Reviewer for Leverhulme Trust Grant Application, 2015
- Co-organizer: Ki-Net / CNA Workshop *Groups and interactions in data, networks and biology*, Pittsburgh, May 2015
- Co-organizer: Workshop *Entropy Methods, PDEs, Functional Inequalities, and Applications* at BIRS, Banff (Canada), June 2014
- NSF Panel Member, 2013
- Co-organizer: Institute for Pure and Applied Mathematics (IPAM) Workshop *Nonlocal PDEs, Variational Problems and their Applications* Los Angeles, February/March 2012.
- Co-organizer: Center for Nonlinear Analysis Summer School *New Vistas in Image Processing and PDEs*, Pittsburgh, June 2010
- Co-organizer: Minisymposium *Scaling and Self-similarity in Models of Materials Science* at SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, May 2010
- Co-organizer: Workshop *Nonlinear Diffusions and Entropy Dissipation: From Geometry to Biology* at BIRS, Banff (Canada), May 2010
- Co-organizer: Minisymposium *Variational Methods and Nonlinear PDE in Image Processing*, at SIAM Conference on Analysis of Partial Differential Equations, Miami, December 2009
- Co-organizer: Center for Nonlinear Analysis Workshop *Energy Driven Systems*, August 2009
- Co-organizer: Center for Nonlinear Analysis Summer School *Contemporary Topics in Nonlinear PDEs*, Pittsburgh, May/June 2008

- Co-organizer: Minisymposium *Variational Models for Advanced Materials* at SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, May 2008
- Co-organizer: Minisymposium *Energy Based Approaches to Nonlinear PDE's* at SIAM Conference on Analysis of Partial Differential Equations, Mesa, December 2007
- Co-organizer: *NSF Workshop on Thin Films and Fluid Interfaces*, Institute for Pure and Applied Mathematics, Los Angeles, January 2006
- Refereed for: Analysis of PDE, Ann. Appl. Probab., Appl. Comput. Harmon. Anal., Arch. Ration. Mech. Anal., Calc. Var. Partial Differential Equations, Comm. Math. Phys., Comm. Math. Sci., Comm. Pure Applied Math., Comm. Pure Applied Anal., Comm. Partial Differential Equations, Discrete Contin. Dyn. Syst., Euro. J. Appl. Mat., ESAIM Control Optim. Calc. Var., Interfaces Free Bound., Inform. and Inference : J. of IMA., J. Differential Equations, J. Engrg. Math., J. Eur. Math. Soc., J. Funct. Anal. J. Mach. Learn. Res. J. Math. Imaging Vision, J. Nonlinear Sci., Nonlinear Anal., Nonlinearity, Physica D, Proc. Amer. Math. Soc., Proc. Natl. Acad. Sci. USA, SIAM J. Appl. Dyn. Syst., SIAM J. Applied. Math., SIAM J. Imaging Sci. SIAM J. Math. Anal., and Trans. Amer. Math. Soc.
- Reviewed for: Mathematical Reviews

MENTORING

POSTDOCS MENTORED
- Lihan Wang (2021-present)
- Raghavendra Venkatraman (2019-2021)
- Francesco Patacchini (2017-2019, scientist, IFP Energies Nouvelles)
- Matthew Thorpe (2015-2017, Postdoc, Cambridge University)
- Xin Yang Lu (2012-2013, 2014-2015, Postdoc, McGill University)
- Gurgen Hayrapetyan (2011-2012, Assistant Professor, Ohio University)
- Ellen Peterson (2010-2012, Assistant Professor, Centre College)

GRADUATE STUDENTS MENTORED
- Lin Chen (2021-present)
- Ruiyu Han (2020-present)
- Danlei Zhu (2019-present)
- Andrew Warren (PhD 2022, IHES Paris)
- Lantian Xu (2019-present)
- (with Bob Pego) Jeff Eisenbeis (PhD 2017, HERE Technologies)
- Slav Kirov (PhD 2017, Eigen Technlogies)
- Nicolás García Trillos (PhD 2015, Prager Assistant Professor, Brown University)
- (with David Kinderlehrer) Lijiang Wu (PhD 2015, Goldman Sachs)

- (with Diogo Gomes) Robert Simione (PhD 2014, Lead Data Scientist at Canvs TV)

UNDERGRADUATE STUDENTS MENTORED

- Xiang Si (2019-2020)
- Jianming Wang (2019-2020)
- Ryan Liu (2017-2019)
- Youpeng Yang (2017-2020)
- Joseph Zoller (2017-2018)
- Yousuf Soliman (2017-2018)
- Jackson Bahr (2016-2017)
- Nicholas Takaki (2014-2015)

COURSES TAUGHT

- Topics in Analysis (Optimal Transport),   2021
- Measure and Integration (graduate)   2018
- General Topology (graduate)   2010, 2011, 2012, 2014, 2015, 2016, 2019
- Differential Geometry (graduate)   2012, 2013, 2016, 2018, 2020
- Partial Differential Equations II (graduate)   2007, 2008, 2009, 2011
- Partial Differential Equations I (graduate)   2006, 2007, 2008, 2010, 2022
- Advanced Topics in Analysis (graduate)   2008, 2014, 2016
- Applied Partial Differential Equations (graduate)   2006
- Applied Ordinary Differential Equations (graduate)   2005
- Undergraduate Research Topics   2013, 2015
- Math Studies Analysis II   2018
- Math Studies Analysis I   2017
- Introduction to Ordinary Differential Equations   2012, 2013, 2014, 2017
- Real Analysis I   2009, 2015
- Real Analysis II   2010, 2018
- Ordinary Differential Equations   2009
- Sequences and Series of Functions   2008
- Mathematical Modeling   2004
- Complex Analysis   2004
- Calculus   2002, 2003, 2004

STUDENT SEMINARS AND COLLOQUIA

- Math Club talk, February 2019
- CNA Summer Undergraduate Applied Mathematics Institute, June 2012
- Undergraduate Colloquium, Carnegie Mellon University, February 2008

- Graduate Student Seminar, UCLA, February 2006

UNIVERSITY SERVICE

- Associate Department Head of the Department of Mathematical Sciences, 2021-present
- Director of the Graduate Studies at the Department of Mathematical Sciences, 2019-present
- Chair of the Search Committee for a Tenure-Track Position in Computational and Applied Mathematics, 2022-present
- MCS Ad-Hoc Tenure Committee, 2017-2018
- Associate Director of the Center for Nonlinear Analysis, 2014-2021
- Chair of the Postdoctoral Search Committee, 2015-2021
- Member of the Search Committee for a Tenure-Track Position in Computational Mathematics, 2017-2018
- Member of the CNA and PIRE Postdoctoral Associate Search Committee 2014-2017
- Chair of the Basic Examinations Committee, 2010-2017
- Member of the Carnegie Mellon University Management Committee of the program in applied mathematics of ICTI 2007-present
- Member of the Search Committee for a Tenure-Track Position in Computational Mathematics, 2014-2015
- Member of the Undergraduate Curriculum Committee, 2010-2015
- Member of the Mellon College of Science Ad-Hoc Nontenure Promotion Committee, 2011-2012
- Member of the Search Committee for a Tenure-Track Position in Applied Analysis, 2011-2012
- Member of the Guy Berry Graduate Research Award Committee, 2010-2012
- Chair of the Graduate Studies Core Requirements Committee, 2008-2009
- Member of the Search Committee for a tenure-track position in applied analysis, 2007-2009
- Member of the Zeev Nehari (postdoctoral position) Appointments Committee, 2007-2008
- Member of the departmental Website Design Committee, 2007-2008