Malena I. Español

ACADEMIC POSITIONS

The University of Akron, Akron, OH
Department of Mathematics
Associate Professor with Tenure — 2018 – Present
Assistant Professor — 2012 – 2018
Department of Mechanical Engineering
Associate Professor (Joint title) — 2018 – Present
Assistant Professor (Joint appointment) — 2016 – 2018

EDUCATION

California Institute of Technology, Pasadena, CA — July 2009 – August 2012
Postdoctoral Scholar
Supervisor: Michael Ortiz

Tufts University, Medford, MA
Ph.D. in Mathematics — May 2009
M.Sc. in Mathematics — May 2005
Advisor: Misha E. Kilmer

Universidad de Buenos Aires, Argentina
***Licenciada* (B.Sc.) in Mathematics** — August 2003
Advisor: Gabriel Acosta, Co-Advisor: Horacio Rotstein (Boston University)

RESEARCH VISITS

- Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, July 2018.
- Hausdorff Research Institute for Mathematics (HIM), University of Bonn, Bonn, Germany, October -December 2011.

PUBLICATIONS

Peer-Reviewed Journal Articles

1. **M. I. Español,** D. Golovaty, and J. P. Wilber. *"Discrete-to-Continuum Modeling of Weakly Interacting Incommensurate Two-Dimensional Lattices".* Proceedings of the Royal Society A 474: 20170612 (2018).

2. **M. I. Español**, D. Golovaty, and J. P. Wilber. *"Euler Elastica as a Γ-Limit of Discrete Bending Energies of One-Dimensional Chains of Atoms"*. Mathematics and Mechanics of Solids 23(7): 1104-1116 (2018).

3. A. Urbizu, B. Martin, D. Moncho, A. Rovira, M. A. Poca. J. Sahuquillo, A. Macaya, and **M. I. Español***. *"Machine Learning Applied to Neuroimaging for Diagnosis of Adult Classic Chiari Malformation: Role of the Basion as a Key Morphometric Indicator"*. Journal of Neurosurgery 129(3): 779-791 (2018). (*Project leader)

4. **M. I. Español,** D. Golovaty, and J. P. Wilber. *"Discrete-to-Continuum Modeling of Weakly Interacting Incommensurate Chains".* Physical Reviews E 96, 033003 (2017).

5. J. M. Chung and **M. I. Español**. *"Learning Regularization Parameters for General-Form Tikhonov"*. Inverse Problems 33 074004 – Special Issue on Learning and Inverse Problems (2017).

6. **M. I. Español** and H. G. Rotstein. *"Complex Mixed-Mode Oscillatory Patterns in a Periodically Forced Excitable Belousov-Zhabotinsky Reaction Model"*. Chaos 25, 064612 (2015).

7. **M. I. Español** and M. E. Kilmer. *"A Wavelet-Based Multilevel Approach for Blind Deconvolution Problems"*. SIAM J. Scientific Computing 36(4): A1432-A1450 (2014).

8. **M. I. Español**, D. M. Kochmann, S. Conti, and M. Ortiz. *"A Γ-Convergence Analysis of the Quasicontinuum Method".* Multiscale Modeling and Simulation 11(3): 766-794 (2013).

9. **M. I. Español** and M. E. Kilmer. *"Multilevel Approach for Signal Restoration Problems with Toeplitz Matrices"*. SIAM J. Scientific Computing 32(1): 299-319 (2010).

10. M. E. Kilmer, P. C. Hansen, and **M. I. Español**. *"A Projection-Based Approach to General-Form Tikhonov Regularization"*. SIAM J. Scientific Computing 29(1): 315-330 (2007).

Conference Proceedings

11. D. J. Rhoads, S. J. Miller, G. D. Roberts, R. W. Rauser, D. Golovaty, J. P. Wilber, and **M. I. Español.** *"Investigation of Carbon Fiber Architecture in Braided Composites using X-Ray CT Inspection"*. Proceedings of the 2017 Society for the Advancement of Material and Process Engineering Conference (SAMPE 2017).

12. M. Wransky, **M. I. Español**, D. McQuaide, and B. Martin. *"MRI-Based Classifiers for Chiari Malformation I"*. Proceedings of the 2013 Midstates Conference for Undergraduate Research in Computer Science and Mathematics (MCURCSM 2013).

13. **M. I. Español**, S. Tsuei, and M. Ortiz. *"Multilevel Methods for Electronic Structure Computations of Materials"*. Proceedings of the Fourth Congress on Industrial, Computational, and Applied Mathematics (MACI). 4 (2013) 183-186.

14. D. M. Kochmann, J. S. Amelang, **M. I. Español**, and M. Ortiz. *"From atomistics to the continuum: a mesh-free quasicontinuum formulation based on local max-ent approximation schemes"*. Proceedings in Applied Mathematics and Mechanics (PAMM). 11 (2011), 393-394.

Publications on Education and Diversity Issues

15. Hala A.H. Shehadeh, Petronela Radu, and **M. I. Español** *"Women in Mathematics of Materials Workshop".* AWM Newsletter 48 (5): 15-18 (2018).

16. A. Alvarez, **M. I. Español**, A. Faridani, C. Flores, A. Marr, E. Newman, J. McNulty, R. Nugent, A. Seneres, M. Shott, W. Y. Velez, and E. Walker. *"The PCMI Workshop for Mentors: A Weeklong Workshop on Diversity?"* Notices of the American Mathematical Society 65 (5): 586-591 (2018).

17. T. J. Cutright, R. K. Willits, D. W. Ott, and **M. I. Español.** *"Development of Educational Artifacts on Wetlands by an Undergraduate, Interdisciplinary Design Team".* Proceedings of the 2018 American Society for Engineering Education North Central Section Conference (ASEENCS2018).

Manuscripts in Preparation

18. M. C. Calderer, **M. I. Español**, L. Mrad, E. Panagiotou, R. Selinger, L. Xu, and L. Zhao. *"Modeling of Toroidal Droplets of Chromonic Liquid Crystal Sunset Yellow"*.

19. **M. I. Español,** D. Golovaty, and J. P. Wilber. *"Discrete-to-Continuum Modeling of Weakly Interacting Incommensurate Honeycomb Lattices".*

20. **M. I. Español**. *"Deblurring Images with Mathematical Models".* Invited article for AMS Notices.

GRANTS

Travel grants awarded are not listed here, but below, next to the corresponding conference or workshop.

1. The University of Michigan's Center for Applied and Interdisciplinary Mathematics (MCAIM), *"Women in Math of Materials (WIMM) Workshop,"* PI: H. A. H. Shehadeh, Co-PIs: **M. I. Español** and P. Radu, May 2018, $25,000.
2. AWM ADVANCE Grant. *"WIMM Research Collaboration Conferences for Women (RCCW),"* PI: H. A. H. Shehadeh, Co-PIs: **M. I. Español** and P. Radu, May 2018, $3,000.
3. NSF DMS 1615952, *"Grain Growth in Graphene: Novel Aspects in Two Dimensions,*" PI: J. P. Wilber, Co-PIs: **M. I. Español** and D. Golovaty, August 2016-July 2019, $247,275.
4. NSF DUE 1457631, *"Affording Opportunities for Sustained Success of STEM Students,"* PI: T. J. Cutright, Co-PIs: **M. I. Español**, T. Leeper, D. Ott, and R. Willits, July 2015-June 2020, $638,676.
5. MAA-Tensor Women and Mathematics Grant, *"Women in Mathematics @ UA,"* **PI: M. I. Español**, May 2014- June 2015, $4,000. (No cost time extension until May 2017).
6. Conquer Chiari Research Grant, *"MRI-Based Classification of Chiari Malformation,"* **PI: M. I. Español**, Co-PI: B. Martin, January 2014-December 2014, $33,646. (No cost time extension until Feb. 2016).
7. Summer Fellowship Research Grant, The University of Akron*, "MRI-Based Classifiers for the Detection of Chiari Malformation,"* **PI: M. I. Español**, Summer 2013, $10,000.

PRESENTATIONS

Invited Conference Talks

1. Discrete-to-Continuum Modeling of Weakly Interacting Incommensurate Chains, *MRS Fall Meeting,* Phoenix, AZ, April 22-26, 2019.
2. Discrete-to-Continuum Modeling of Weakly Interacting Incommensurate Chains, *SIAM Central States Meeting,* University of Oklahoma, Norman, OK, October 5-7, 2018.
3. Discrete-to-Continuum Modeling of Weakly Interacting Incommensurate Chains, *SIAM Conference on Mathematical Aspects of Materials Science*, Portland, OR, July 9-13, 2018.
4. A Learning Approach for Computing Regularization Parameters for General-Form Tikhonov Regularization, *SIAM Annual Meeting,* Pittsburgh, PA, July 10-14, 2017.
5. Image Deblurring Using Mathematical Models, Plenary Lecture, *MAA Ohio Section Fall Meeting,* College of Wooster, Wooster, OH, October 28-29, 2016.

6. A Learning Approach for Computing Regularization Parameters for General-Form Tikhonov Regularization, *SIAM Annual Meeting,* Boston, MA, July 11-15, 2016.
7. An Upscaling Procedure for Passing from an Atomistic to a Continuum Model of Multi-Walled Carbon Nanotubes, *MRS Fall Meeting*, Boston, MA, November 30-December 5, 2014. ***Received NSF Symposium Funding***
8. Morphometric-Based Classification for Chiari Malformation, *Conquer Chiari Research Conference: Advancing Diagnosis, Management & Understanding*, The University of Akron, Akron, OH, November 7-8, 2014.
9. Deblurring Images with Mathematical Models, *SACNAS National Conference*, Los Angeles, CA, October 16-18, 2014. ***Received Conference Travel Funding***
10. A Gamma-Convergence Analysis of the Quasicontinuum Method, *IUTAM Symposium on Innovative Numerical Approaches for Materials and Structures in Multi-field and Multi-Scale Problems. A symposium on the occasion of Michael Ortiz's 60th birthday,* Burg Schnellenberg, Germany, September 1-4, 2014.
11. Multilevel Methods for Deblurring Problems, *Conference on Frontiers in Applied and Computational Mathematics*, New Jersey Institute of Technology, Newark, NJ, May 31-June 2, 2013. ***Received Conference Funding***
12. Multilevel Methods for Deblurring Problems, *Mathematical Challenges in Biomolecular/Biomedical Imaging and Visualization Workshop*, Mathematical Biosciences Institute (MBI), Columbus, OH, February 18-22, 2013. ***Received Workshop Travel Funding***
13. A Gamma-Convergence Analysis of the Quasicontinuum Method, *Annual Technical Meeting of the Society of Engineering Science,* Atlanta, GA, October 10-12, 2012.
14. A Gamma-Convergence Analysis of the Quasicontinuum Method, *AWM Workshop for Women Graduate Students and recent PhDs*, *SIAM Annual Meeting*, Minneapolis, MN, July 8-13, 2012. ***Received Association for Women in Mathematics (AWM) Travel Award***
15. A Gamma-Convergence Analysis of the Quasicontinuum Method, *Pattern Formation and Multiscale Phenomena in Materials Workshop,* Mathematical Institute, University of Oxford, Oxford, United Kingdom, September 26-28, 2011.
16. Multilevel Methods for Deblurring Problems, *Applied Mathematics and Image Processing Summer Workshop,* University of Texas - Pan American, Edinburg, TX, May 30-June 1, 2011. ***Received Workshop Travel Funding***
17. A Multilevel, Modified Regularized Total Least Norm Approach to Signal Deblurring, *Applied Inverse Problems Conference,* Texas A&M University, College Station, TX, May 23-27, 2011. ***Received Conference Travel Award***
18. Multilevel Methods for Image Deblurring, *SIAM Conference on Computational Science and Engineering*, Reno, NV, February 28-March 4, 2011.
19. A Multilevel, Modified Regularized Total Least Norm Approach to Signal Deblurring, *AMS Joint Mathematics Meetings*, San Francisco, CA, January 13-16, 2010.
20. A Modified, Regularized Total Least Norm Approach to Signal Restoration, *SIAM Conference on Applied Linear Algebra*, Monterey Bay-Seaside, CA, October 26-29, 2009. ***Received SIAM Postdoctoral Travel Award***
21. Multilevel Approaches for the Total Least Squares Method in Deblurring Problems, *International Conference on Industrial and Applied Mathematics*, Zurich, Switzerland, July 16-20, 2007. ***Received SIAM Student Travel Award***
22. An Iterative, Projection-Based Algorithm for General Form Tikhonov Regularization, *SIAM Annual Meeting*, New Orleans, LA, July 11-15, 2005.

Contributed Conference Talks

23. Modeling of 2D Materials, MAA Ohio Section Fall Meeting, Malone University, Canton, OH, October 26-27, 2018.

24. Deblurring Images with Mathematical Models, Infinite Possibilities Conference, Howard University, Washington DC, April 14-15, 2018.
25. Registry Effects in Carbon Nanostructures, Nonconvexity, Nonlocality, and Incompatibility: From Materials to Biology, conference in honor of Lev Truskinovsky's 60th birthday, Department of Mathematics, University of Pittsburgh, Pittsburgh, PA, May 5-7, 2017.
26. An Upscaling Procedure for Passing from an Atomistic to a Continuum Model of Multi-Walled Carbon Nanotubes, *SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, PA, May 8-12, 2016.
27. A Learning Approach for Computing Regularization Parameters for General-Form Tikhonov Regularization, *MAA Ohio Section Spring Meeting*, Ohio Northern University, Ada, OH, April 8, 2016.
28. Optimal Regularization Parameters for General-Form Tikhonov Regularization, *SIAM Conference on Imaging Science*, Hong Kong, May 12-14, 2014.
29. Optimal Regularization Parameters for General-Form Tikhonov Regularization, *Annual Midwest Women in Mathematics Symposium*, University of Notre Dame, South Bend, IN, April 5, 2014. ***Received Symposium Travel Funding***
30. Wavelet-Based Multilevel Methods for Eigenvalue Problems, *Joint Mathematics Meetings*, Baltimore, MD, January 15-18, 2014.
31. Multilevel Methods for Electronic Structure Computations of Materials, *Conference on Applied, Computational, and Industrial Mathematics*, Buenos Aires, Argentina, May 15-17, 2013.
32. Wavelet-Based Multilevel Methods for Eigenvalue Problems, *Frontiers in Numerical Analysis and Scientific Computing - A conference on the occasion of Lothar Reichel's 60th birthday and on the 20th anniversary of ETNA*, Kent State University, Kent, OH, April 19-20, 2013.
33. A Gamma-Convergence Analysis of the Quasicontinuum Method, *U.S. National Congress on Computational Mechanics (USNCCM-11)*, Minneapolis, MN, July 25-29, 2011. ***Received Congress Travel Award***
34. A Gamma-Convergence Analysis of the Quasicontinuum Method, *International Conference on Industrial and Applied Mathematics*, Vancouver, BC, Canada, July 18-22, 2011. ***Received SIAM Postdoctoral Travel Award***
35. Multilevel Approach for Signal Restoration Problems with Toeplitz Matrices, *Copper Mountain Conference on Iterative Methods*, Copper Mountain, CO, April 6-11, 2008. ***Received Conference Travel Funding***
36. Image Deblurring with Mathematical Models, *Annual Graduate Student Research Symposium at Tufts University*, Medford, MA, March 29, 2008.
37. Ill-Posed Problems and Regularization Methods, *NES/MAA Fall 2005 Meeting*, Durham, NH, November 18-19, 2005.

Posters

38. Registry Effects in Carbon Nanostructures, Women in Mathematics of Materials Workshop, University of Michigan's Center for Applied and Interdisciplinary Mathematics, Ann Arbor, MI, May 14-18, 2018.
39. A Discrete-to-Continuum Model of Weakly Interacting Incommensurate Chains, *IMA Hot Topic Workshop Mathematical Modeling of 2D Materials*, Minneapolis, MN, May 16-19, 2017. ***Received Workshop Funding***
40. Registry Effects in Carbon Nanostructures, *Sustainable Research Pathways Meeting*, Lawrence Berkeley National Lab, Berkeley, CA, December 7, 2016. ***Received Meeting Funding***
41. An Upscaling Procedure for Passing from an Atomistic to a Continuum Model of Multi-Walled Carbon Nanotubes, *IMA Special Workshop Mathematics and Mechanics in the 22nd Century and Counting, ...*, Eugene, OR, October 23-25, 2015. ***Received NSF Conference Funding***

42. MRI-Based Classifiers for the Detection of Chiari Malformation, *Conquer Chiari Research Center Open House*, The University of Akron, Akron, April 27, 2013.
43. A Gamma-Convergence Analysis of the Quasicontinuum Method, *U.S. National Congress on Computational Mechanics*, Minneapolis, MN, July 25-29, 2011. ***Received Congress Travel Award***
44. A Gamma-Convergence Analysis of the Quasicontinuum Method, *SIAM Conference on Computational Science and Engineering*, Reno, NV, February 28-March 4, 2011.
45. A Gamma-Convergence Analysis of the Quasicontinuum Method, *IPAM Women in Mathematics Symposium*, Los Angeles, CA, February 24-26, 2011.
46. A Multilevel, Modified Regularized Total Least Norm Approach to Signal Deblurring, *Conference on Numerical Linear Algebra: Perturbation, Performance and Portability*, Austin, TX, July 19-20, 2010. ***Received Conference Travel Funding***
47. Multilevel Approach for Signal Restoration Problems with Toeplitz Matrices, *CIG Workshop on Mathematical and Computational Issues in the Solid Earth Geosciences*, Santa Fe, NM, September 15-17, 2008. ***Received Workshop Travel Funding***
48. Multilevel Approach for Signal Restoration Problems with Toeplitz Matrices, *AWM Workshop for Women Graduate Students and recent PhDs*, *SIAM Annual Meeting*, San Diego, CA, July 7-11, 2008. ***Received Association for Women in Mathematics (AWM) Travel Award***

Seminars and Other Talks

49. Deblurring Images with Mathematical Models, Applied and Computational Math Seminar, Arizona State University, Tempe, AZ, February 2, 2018.
50. Deblurring Images with Mathematical Models, Math Department Colloquium, Cleveland State University, Cleveland, OH, April 21, 2017.
51. Deblurring Images with Mathematical Models, Department of Mathematics and Computer Science Pizza Talks, Ohio Wesleyan University, Delaware, OH, April 19, 2017.
52. Learning from Data: Applications to Image Deblurring and Medical Diagnosis, Center for Data Science, Analytics, and IT Seminar, The University of Akron, Akron, OH, October 17, 2016.
53. Math Student Organizations: How to Start Them and Keep Them Going, Ohio NExT Workshop, Ohio Northern University, Ada, OH, April 8, 2016.
54. An Efficient Learning Approach for Computing Regularization Parameters for General-Form Tikhonov Regularization, Computational and Applied Mathematics Seminar, Kent University, Kent, OH, October 16, 2015.
55. The Math Behind Image Deblurring, National Center for Space Exploration and Research (NCSER) Seminar, NASA Glenn Research Center, Cleveland, OH, June 20, 2014.
56. MRI-Based Classifiers for the detection of Chiari Malformation, Office of Research Administration (ORA) Research for Lunch, The University of Akron, Akron, OH, March 5, 2014.
57. Morphometric-Based Classification for Chiari Malformation, International Chiari Research Group Monthly Meeting, Conquer Chiari Research Center, The University of Akron, Akron, OH, December 6, 2013.
58. A Gamma-convergence Analysis of the Quasicontinuum Method, Computational and Applied Mathematics Seminar, Kent University, Kent, OH, September 27, 2013.
59. Multilevel Methods for Image Deblurring, Imaging Seminar, Case Western Reserve University, Cleveland, OH, September 18, 2013.
60. A Gamma-convergence Analysis of the Quasicontinuum Method, Mechanics, Materials and Computing Seminar, Carnegie Mellon University, Pittsburgh, PA, February 8, 2013.
61. Multilevel Methods for Image Deblurring, Computational and Applied Mathematics Seminar, Kent University, Kent, OH, September 28, 2012.

62. A Gamma-convergence Analysis of the Quasicontinuum Method, PDE and Analysis Seminar, University of Pittsburgh, Pittsburgh, PA, September 24, 2012.
63. Multilevel Methods for Image Deblurring, PDE and Applied Mathematics Seminar, University of Akron, Akron, OH, September 20, 2012.
64. A Gamma-convergence Analysis of the Quasicontinuum Method, Department of Mathematics, California Polytechnic State University, San Luis Obispo, CA, January 31, 2012.
65. A Gamma-convergence Analysis of the Quasicontinuum Method, Department of Mathematics, Kennesaw State University, Kennesaw, GA, January 17, 2012
66. A Gamma-convergence Analysis of the Quasicontinuum Method, Department of Mathematics, University of Akron, Akron, OH, January 13, 2012.
67. A Gamma-Convergence Analysis of the Quasicontinuum Method, Mathematics in the Sciences Seminar, Institute for Mathematics, University of Wurzburg, Wurzburg, Germany, December 8, 2011.
68. A Gamma-Convergence Analysis of the Quasicontinuum Method, Applied Analysis Seminar, Institute for Applied Mathematics, University of Bonn, Bonn, Germany, December 1, 2011.
69. A Gamma-Convergence Analysis of the Quasicontinuum Method, Seminar Series in Numerical Mathematics and Mechanics, Institute for Mechanics, University of Duisburg-Essen, Essen, Germany, November 28, 2011.
70. A Gamma-Convergence Analysis of the Quasicontinuum Method, Differential Equations and Numerical Analysis Seminar, Departamento de Matemáticas, Universidad de Buenos Aires, Argentina, September 13, 2011.
71. Multilevel Methods for Image Deblurring, Statistics/OR/Math Finance Seminar, Claremont Center for the Mathematical Sciences, Claremont, CA, November 4, 2010.
72. Multilevel Methods for Deblurring Problems, Center for Engineering Science Advanced Research (CESAR) Seminar, Oak Ridge National Laboratory, Oak Ridge, TN, May 12, 2009.
73. Multilevel Methods for Deblurring Problems, Computational Solid Mechanics Group Seminar, California Institute of Technology, Pasadena, CA, May 8, 2009.
74. A Multilevel, Modified Regularized Total Least Norm Approach to Signal Deblurring, Numerical Analysis Seminar, Department of Mathematics, University of Maryland, College Park, MD, April 21, 2009.
75. Multilevel Methods for Ill-Posed Problems, SIAM Student Chapter Luncheon Seminar, Tufts University, Medford, MA, November 19, 2008.
76. Multilevel Methods for Ill-Posed Problems, Applied Mathematics and Scientific Computing Seminar, Department of Mathematics, Temple University, Philadelphia, PA, November 12, 2008.
77. Multilevel Methods for Ill-Posed Problems, Differential Equations and Numerical Analysis Seminar, Departamento de Matemáticas, Universidad de Buenos Aires, Argentina, May 14, 2008.
78. Neural Decoding: Classifiers in Action, SIAM Student Chapter Luncheon Seminar, Tufts University, Medford, MA, November 19, 2007.
79. Neural Decoding: Classifiers in Action, Kreiman Lab Seminar, Children's Hospital Boston, Boston, MA, August 31, 2007.
80. Discrete Ill-Posed Problems and Regularization Methods, Kreiman Lab Seminar, Children's Hospital Boston, Boston, MA, June 17, 2007.
81. Singular Value Decomposition and its Applications to Ill-Posed Problems, Student Seminar, Departamento de Matemáticas, Universidad de Buenos Aires, Argentina, May 14, 2007.
82. Summer Experience at The MathWorks, Presentation for Computer Science, Engineering, and Mathematics Scholars (CSEMS) at Tufts University, Medford, MA, November 8, 2006.
83. A Summer Experience at The MathWorks, SIAM Student Chapter Luncheon Seminar, Tufts University, Medford, MA, November 1, 2006.

84. Image Deblurring, Image Processing Team Meeting, The MathWorks, Natick, MA, August 24, 2006.
85. A Multilevel Method for Ill-Posed Problems, MATLAB Math Team, The MathWorks, Natick, MA, January, 2006.

ATTENDED WORKSHOPS

Research Workshops

1. Michigan Center for Applied and Interdisciplinary Mathematics (MCAIM) Women in Mathematics of Materials (WIMM) Workshop, University of Michigan, Ann Arbor, MI, May 14-18, 2018. ***Received Workshop Funding***
2. Institute for Mathematics and its Applications (IMA) Hot Topic Workshop: Mathematical Modeling of 2D Materials, University of Minnesota, Minneapolis, MN, May 16-19, 2017. ***Received Workshop Funding***
3. The 24th Annual IAS/Park City Mathematics Institute (PCMI) Summer Session, Mathematics and Materials, Undergraduate Faculty Program, Park City, UT, June 29 – July 19, 2014. ***Received Program Funding***
4. Mathematical Biosciences Institute (MBI) Current Topic Workshop: Mathematical Challenges in Biomolecular/Biomedical Imaging and Visualization, Ohio State University, Columbus, OH, February 18-22, 2013. ***Received Workshop Travel Funding***
5. Institute for Mathematics and Its Applications (IMA) NSF PIRE Summer School: New Frontiers in Multiscale Analysis and Computing Materials, University of Minnesota, Minneapolis, MN, June 21-29, 2012.
6. Mathematical Challenges of Materials Science Condensed Matter Physics: From Quantum Mechanics Through Statistical Mechanics to Nonlinear PDE, Hausdorff Trimester Program, Hausdorff Research Institute for Mathematics (HIM), Bonn, Germany, May 20-June 16, 2012. ***Received Program Funding***
7. Institute for Mathematics and its Applications (IMA) Large-scale Inverse Problems and Quantification of Uncertainty Workshop, University of Minnesota, Minneapolis, MN, June 6-10, 2011. ***Received Workshop Travel Funding***
8. Institute for Pure and Applied Mathematics (IPAM) Women in Mathematics Symposium, UCLA, Los Angeles, CA, February 24-26, 2011.
9. Mathematical Sciences Research Institute (MSRI) Introductory Workshop on Inverse Problems and Applications, Berkeley, CA, August 23-27, 2010. ***Received Workshop Travel Funding***
10. Summer School in Seismic Imaging, University of Washington, Seattle, WA, August 10-14, 2009. ***Received Summer School Travel Funding***
11. American Mathematical Society Mathematics Research Communities (AMS MRC) Program in Inverse Problems, Snowbird Resort, UT, June 20-26, 2009. ***Received Program Travel Funding***
12. Graduate Student Workshop in Inverse Problems, Colorado State University, Ft. Collins, CO, July 30-August 3, 2007. ***Received Workshop Travel Funding and Tufts GSAS Travel Award***
13. Mathematical Modeling in Industry: A Workshop for Graduate Students, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, August 1-10, 2005. ***Received Workshop Travel Funding and Tufts GSAS Travel Award***

Faculty Development and Diversity and Inclusion Workshops

1. MAA PIC Math Program – Preparation for Industrial Careers in Mathematical Sciences – Summer Training Workshop, Salt Lake City, UT, May 29 – June 2, 2018. ***Received Program Funding***

2. Mathematical Sciences Research Institute (MSRI) Workshop on Critical Issues in Mathematics Education 2018: Access to Mathematics by Opening Doors for Students Currently Excluded from Mathematics, February 21 - 23, 2018, MSRI, Berkeley, CA. ***Received Workshop Funding***
3. The 27th Annual IAS/Park City Mathematics Institute (PCMI) Summer Session, Workshop on Increasing Minority Participation in Undergraduate Mathematics, Park City, UT, June 26 – 30, 2017. ***Received Program Funding***
4. Ohio NExT Workshop, Ohio Northern University, Ada, OH, April 8, 2016.
5. Project NExT Workshop, MAA MathFest, Portland, OR, August 6-9, 2014.
6. Ohio NExT Workshop, The University of Toledo, Toledo, OH, April 3-4, 2014.
7. Ohio NExT Workshop, Cleveland State University, Cleveland, OH, October 3-4, 2013.
8. Project NExT Workshop, MAA MathFest, Hartford, CT, July 29 – August 3, 2013.

STUDENTS SUPERVISION

Graduate Students

The University of Akron

1. Alexander Alberts, MS in Applied Mathematics (Co-advised with D. Quinn, D. Golovaty and P. Wilber), Fall 2017– Present.
2. Emmanuel Rivera, MS in Applied Mathematics (Co-advised with D. Golovaty and P. Wilber), Fall 2017– Present.
3. Lucas Stanek, MS in Applied Mathematics (Co-advised with D. Golovaty and P. Wilber), "*Deformation of a Graphene Sheet Driven by Lattice Mismatch with a Supporting Substrate*," 2017.
4. Amirreza Hashemi, MS in Applied Mathematics, "*Parameter Choices for the Split Bregman Method Applied to Signal Restoration*," 2016.
5. Rachel Richards, MS in Applied Mathematics, *"Morphometric-Based Classification for Chiari Malformation Type I,"* 2015.
6. Michael Wransky, MS in Applied Mathematics, *"True Color Measurements Using Color Calibration Techniques,"* 2015.
7. Daniel Rhoads, MS in Applied Mathematics (Co-advised with D. Golovaty and P. Wilber), *"A Mathematical Model of Graphene Nanostructures,"* 2015.
8. Mona Matar, MS in Applied Mathematics (Co-advised with D. Golovaty and P. Wilber), *"Atomistic-to-continuum Modeling of the Detachment of a Graphene Sheet,"* 2014.
9. Tim Nixdorf, MS in Applied Mathematics (Co-advised with D. Golovaty and P. Wilber), *"A Mathematical Model for Carbon Nanoscrolls,"* 2014.
10. Ting Gao, MS in Applied Mathematics (Co-advised with D. Golovaty and P. Wilber), *"Energy-Based Model of Multi-Walled Carbon Nanotubes: Atomistic-to-continuum Approach Including Nonlocal Interactions,"* 2013.

Undergraduate Research Mentoring

The University of Akron

1. Jonathan Wittmer, research project, Spring 2018 - Present.
2. Andrew Markja, research assistant (Co-advised with D. Golovaty and P. Wilber), Summer 2018.
3. Steven Abbate, research assistant (Co-advised with D. Golovaty and P. Wilber), Summer 2018.
4. Alexander Alberts, research assistant (Co-advised with D. Golovaty and P. Wilber), Spring 2017.
5. Emmanuel Rivera, research assistant (Co-advised with D. Golovaty and P. Wilber), Spring 2017.
6. Marissa Gross, research assistant (Co-advised with D. Golovaty and P. Wilber), Spring 2017.

7. Mackenzie Jones, research project, *"Filtered Correlation Matrix for Sparse Markowitz Portfolios,"* Spring 2016.
8. Oliver Evans, research assistant, *"Classifying Chiari Malformation Patients,"* Spring 2016.
9. Michael Wransky, Honors Thesis: *"MRI-Based Classifiers for the Detection of Chiari Malformation,"* (Co-advised with B. Martin), 2014.
10. Christopher Brandt, Summer project: *"Markowitz Portfolio Selection,"* 2013.
11. Hannah Lebo, Summer project: *"The Laplacian Pyramid and its Application to Magnetic Resonance Images,"* 2013.

California Institute of Technology

12. Arturo J. Mateos, *"Design of Multivariate Interpolation Schemes,"* MURF, 2012.
13. Hyun Ji Jane Bae, *"Analysis of Atomistic Models for Solid Materials,"* SURF 2011.
14. Ka Kin Kenneth Hung, *"Analysis of the Quasicontinuum Method,"* SURF 2011.
15. Andre Pradhana, *"Solving Kohn-Sham Equation via Iterative Methods,"* SURF 2010.
16. Stephanie Tsuei, *"Developing Computational Tools to Predict Material Behavior,"* SURF 2010.

Doctoral, Master's, and Honors Thesis Committees

- Served on 18 PhD thesis Committees: Hui Tao, Civil Engineering, 2018; Sagr Alamri, Mechanical Engineering, 2018; Nilan Udayanga, Electrical and Computer Engineering, 2018; Akm Arafat, Electrical and Computer Engineering, 2018; Faez Alkadi, Mechanical Engineering, 2018; Davindra Tulsi, Polymer Engineering, 2018; Jui-Hsiang Hung, Polymer Engineering, 2017; Xuan Li, Psychology, 2017; Anup Pant, Biomedical Engineering, 2017; Sudip Adhikari, Mechanical Engineering, 2017; Ehsan Saeidpour Parizy, Electrical and Computer Engineering, 2017; Osama Alkhateeb, Electrical and Computer Engineering, 2017; Ardalan Alizadeh, Electrical and Computer Engineering, 2016; Zhao Li, Civil Engineering, 2016; Abdullateef Hasan Bashiri, Mechanical Engineering, May 2016; Jing Zhong, Polymer Engineering, 2016; Amirhossein Molavi Tabrizi, Civil Engineering, November 2015, Nicholas Shaffer, Mechanical Engineering, November 2014.
- Served as Reader for 2 Master's Theses: William Sands, Applied Mathematics, 2017; Cody Wood, Applied Mathematics, 2017.
- Served as Reader for 2 Honors Theses: Mackenzie Jones, Applied Mathematics, 2018; Oliver Evans, Applied Mathematics, 2018.

TEACHING EXPERIENCE

The University of Akron, Akron, OH August 2012 – Present
Instructor
Introduction to Ordinary Differential Equations
Linear Algebra
Applied Numerical Methods I and II
Advanced Numerical Analysis I and II
Honors Colloquium: The Impact of Mathematics in the World Around Us
Topics in Mathematics: Discrete Inverse Problems
Undergraduate Individual Reading: Mathematical Methods in Medical Image Processing
Graduate Individual Reading: Wavelets and their Applications

California Institute of Technology, Pasadena, CA March 2010 – December 2010
Instructor
Reading and Independent Study in Electronic Structure of Materials
Reading and Independent Study in Computational Physics

Tufts University, **Department of Mathematics, Medford, MA** September 2005 – May 2009
Instructor
Introduction to Calculus
Calculus I
Calculus II

Teaching Assistant
Applications of Advanced Calculus
Numerical Analysis
Numerical Linear Algebra
Symmetry

Universidad de Buenos Aires, Argentina April 1998 – June 2001
Instructor
Calculus for Economists
Algebra for Economists

OTHER RESEARCH/PROFESSIONAL EXPERIENCE

Harvard University - Children's Hospital, Boston, MA June – August 2007
Research Assistant
Supervisor: Gabriel Kreiman
Designed and implemented regularized classifiers in MATLAB to decode the activity of neural populations in the cerebral cortex. Applied machine learning techniques to data obtained from electroencephalograms of epileptic patients.

The MathWorks, Natick, MA June – August 2006
Summer Intern
Supervisor: Patrick D. Quillen
Designed, implemented in C++, and tested algorithms for computing Incomplete LU (ILU) factorizations (ILU(0), ILUT, and MILU). These subroutines have been incorporated in MATLAB 2007a.

BC Alejandro Bloise Consulting, Buenos Aires, Argentina October 1998 – June 2001
Actuarial Assistant
Supervisor: Alejandro Bloise
Priced life and health insurance products.

HONORS AND AWARDS

- Featured in the Website "Women Do Math". https://www.womendomath.org/malena-espanol/
- Featured in the Website "Lathisms", September 24, 2017. http://lathisms.org/september-24th.html
- 2013-2014 Project NExT Fellow, Mathematical Association of America.
- 2009 Mathematical Research Communities (MRC) Member, American Mathematical Society.
- 2008 SIAM Student Chapter Certificate of Recognition.

PROFESSIONAL SERVICE

- Referee for SIAM Journal on Scientific Computing, Inverse Problems, Applied Numerical Mathematics, IEEE Signal Processing Letters, Inverse Problems and Imaging, Numerical Linear Algebra and Applications, Journal of Computational and Applied Mathematics, Mathematics of

Computation, Mathematical Methods of Operations Research, PLOS ONE, Journal of Humanistic Mathematics, BIT Numerical Mathematics, and SIAM Journal of Matrix Analysis and Applications.

- Reviewer for Mathematical Reviews.
- Managing Editor for the Journal Electronic Transactions on Numerical Analysis (ETNA). Since April 2014
- MAA Project NExT Mentoring Facilitator. Since May 2018
- MAA Ohio NExT Organizing Committee Member. Since May 2018
- AWM SIAM Committee Member. Since March 2018
- AWM Student Chapters Committee Member. Since August 2017
- NSF panel reviewer. 2015, 2017, 2018
- AWM Graduate Poster Organizer, SIAM CSE, Spokane, WA. 2019
- Program Committee Member, Midstates Conference for Undergraduate Research in Computer Science and Mathematics, DePauw University, Greencastle, IN. Fall 2017
- AWM Graduate Poster Competition Judging Coordinator, SIAM Annual, Pittsburgh, PA. 2017
- SIAM Diversity Advisory Committee Member. January 2014 – December 2016
- SIAM Travel Award Committee Member, ICIAM Congress, Beijing, China. 2015
- Program Committee Member, Midstates Conference for Undergraduate Research in Computer Science and Mathematics, The College of Wooster, Wooster, OH. Fall 2014
- Judge, SACNAS Student Poster Session, Los Angeles, CA. October 18, 2014
- Judge, MAA Undergraduate Student Poster Session, JMM, Baltimore, MD. January 17, 2014
- Program Committee Member, Midstates Conference for Undergraduate Research in Computer Science and Mathematics, Ohio Wesleyan University, Delaware, OH. Fall 2013
- Judge, Undergraduate Research Paper Presentation Session, MAA Mathfest. August 2, 2013
- Judge, Doris S. Perpall SURF Speaking Competition at Caltech. October 16, 2010

Conference Organization

- 2019 MAA Ohio Section Spring Meeting, The University of Akron, Akron, OH, April 5-6, 2019. Local organizer with Laurie Dunlap and Katie Cerrone.

Workshop Organization

- Women in Mathematics of Materials Workshop with H. A.H. Shehadeh and P. Radu. University of Michigan's Center for Applied and Interdisciplinary Mathematics, Ann Arbor, MI, May 14-18, 2018.

Minisymposium Organization

1. Modeling the Mechanics of 2D Material with P. Cazeaux, *International Conference on Industrial and Applied Mathematics*, Valencia, Spain, July 15-29, 2019.
2. Machine Learning for Materials with K. Saleme, *International Conference on Industrial and Applied Mathematics*, Valencia, Spain, July 15-29, 2019.
3. Data Science and Analytics in Industry. *SIAM Conference on Computational Science and Engineering*, Spokane, WA, Feb 25 - March 1, 2019.
4. Best Practices in Promoting Diversity and Inclusiveness in and Outside the Applied Mathematics Classroom with M. Shott. *SIAM Conference on Applied Mathematics Education*, Portland, OR, July 9-11, 2018.
5. Modeling and Simulation of Nanostructures and 2D Materials with P. Wilber. *SIAM Annual Meeting*, Pittsburgh, PA, July 10-14, 2017.

6. Recent Advances in Image Classification and Recognition, *SIAM Conference on Imaging Science,* Albuquerque, NM, May 23-26, 2016.
7. Upscaling Models of Crystalline Structures: Analysis and Simulation, with H. A.H. Shehadeh, *SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, PA, May 8-12, 2016.
8. Advances in Numerical Linear Algebra for Imaging with J. Chung, *SIAM Conference on Imaging Science,* Hong Kong, May 12-14, 2014.
9. Mathematical Modeling of Dislocations in Crystalline Solids with D. Golovaty, *SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, PA, June 9-12, 2013.
10. Atomistic/Continuum Multiscale Methods of Solids with P. Lin, M. Luskin, C. Ortner, and M. Ortiz, *International Conference on Industrial and Applied Mathematics*, Vancouver, BC, Canada, July 18-22, 2011. ***Received SIAM Postdoctoral Travel Award***
11. Inverse Problems in Industrial Applications with J. Chung, *SIAM Conference on Computational Science and Engineering*, Miami, FL, March 2-6, 2009. ***Received SIAM Student Travel Award and Tufts GSAS Travel Award***

Panel Organization

1. Independent study courses with W. Abram, D. Moseley, and C. Wright, Project NExT, *MathFest*, Portland, OR, August 6-9, 2014.
2. Math-related service activities and outreach with N. Reff, D. Roberts, and L. Ziegelmeier, Project NExT, *Joint Mathematics Meetings*, Baltimore, MD, January 15-18, 2014.

UNIVERSITY AND DEPARTMENTAL SERVICE

- Advisor, SIAM Student Chapter, Department of Mathematics, UA. Spring 2015 – Present
- Advisor, AWM Student Chapter, Department of Mathematics, UA. Fall 2013 – Present
- Outreach Committee Member, Department of Mathematics, UA. Spring 2013 – Present
- Faculty Research Committee Member Fall 2018 – Spring 2021
- Faculty Senate Member Fall 2018 – Spring 2021
- Tenure Track Search Committee Member, Department of Mathematics, UA. Spring 2018
- Chair Review Committee Member, Department of Mathematics, UA. Spring 2016
- Invited Panelist, Building a Community of Women Leaders in BCAS, UA April 24, 2013
- Co-mentor, Summer Undergraduate Research Fellowship Program at Caltech. Summer 2010, 2011
- Co-mentor Advisory Council Member, Student Faculty Programs (SFP) at Caltech. Summer 2010, 2011
- President and Founder, SIAM Student Chapter at Tufts University. November 2004 – August 2006
- Co-President, Math Club at Tufts University. February 2004 – March 2006

OUTREACH

- Mentor for The National Alliance for Doctoral Studies in the Mathematical Sciences (Math Alliance), a community of math sciences faculty and students whose main goal is to increase the number of doctoral degrees in the mathematical sciences among groups that have been traditionally underrepresented in those fields. Joint in July 2017.
- Invited Speaker, Hispanic Heritage Month Celebration, Chaney High School, Youngstown, OH, September 28, 2018.

- Invited Speaker, *"My Journey as an Applied Mathematician"*, Hispanic Heritage Month Lecture Series, Department of Mathematics and Statistics, Youngstown State University, Youngstown, OH, September 21, 2018.
- Co-organizer, Women in Mathematics of Materials Networking Luncheon, *SIAM Conference on Mathematical Aspects of Materials Science*, Portland, OR, July 11, 2018.
- Invited Speaker for the Speaker Series "Face to Face - Redefining the Expected", which was part of Rethinking Race. Dr. Rouzbeh Amini and I lead a discussion about redefining society's expectations of people based on demographic intersections such as race, religion/faith, socioeconomic status, family structure etc.,The University of Akron, Akron, OH, February 7, 2018.
- Volunteer, Code Girl Day, a half day program for middle school girls, The University of Akron, Akron, OH, December 7, 2017.
- Invited Speaker, *"Math and Image Processing",* induction ceremony for the mathematics honors society Mu Alpha Theta at St. Vincent - St. Mary High School, Akron, OH, February 22, 2017.
- Judge, AWM Essay Contest: Biographies of Contemporary Women in Mathematics, 2012, 2013, 2014, 2016, 2017.
- Judge, Ada Lovelace Day Poster Competition, The University of Akron, Akron, OH, October 18, 2016.
- Judge, AWM Poster Competition, *SIAM Annual Meeting*, Boston, MA, July 11-15, 2016.
- Co-organizer, Women in Mathematics of Materials Networking Luncheon, *SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, PA, May 9, 2016.
- Invited Speaker, *"From Argentina to Akron and Everything in Between"*, Hispanic Organization Leading Akron (H.O.L.A.) Weekly Meeting, The University of Akron, Akron, OH, November 19, 2015.
- Judge, Ada Lovelace Day Poster Competition, The University of Akron, Akron, OH, October 13, 2015.
- Invited Speaker, "*Deblurring Images with Mathematical Models*", Akron Physics Club, Akron, OH, September 20, 2014.
- Volunteer, Kids' Career Day, a half day program organized by Women in Engineering at UA, that is designed to involve children in interactive activities related to occupations in engineering, science, technology, and math. The University of Akron, Akron, OH, March 1, 2014.
- Judge, AWM Poster Competition, *Joint Mathematics Meetings*, Baltimore, MD, January 15-18, 2014.
- Invited Speaker, *"My Journey Through Applied Mathematics (so far!)"*, Hispanic Heritage Month Lecture Series, Department of Mathematics and Statistics, Youngstown State University, Youngstown, OH, September 20, 2013.
- Math Tutor, Organizacion Civica y Cultural Hispana Americana (OCCHA), a non-profit organization whose mission is to help the Spanish-speaking community in the Youngstown area, Boardman, OH, Fall 2013.
- Mentor, Women Mentoring Women Program at Caltech. September 2009 – August 2012
- Judge, Intel International Science and Engineering Fair, an international science competition for students in grades 9-12, Los Angeles, CA, May 8-13, 2011.
- Board Member, The Somerville Mathematics Fund, a community organization that provides scholarships and math enrichment to the Somerville Community, Somerville, MA, May 2005 – June 2009.
- Volunteer, Scrapheap Showdown, a competition and fundraiser for the Somerville Mathematics Fund, where teams of three students have to solve a creative engineering problem in a single

afternoon using salvage materials provided at the site of the competition, Medford, MA, 2006 and 2008.

- Volunteer, Family Math Night, a community event that consisted of math games and activities for middle school students and their families hold at the East Somerville Community School, Somerville, MA, April 9, 2007.
- Invited Speaker, *"A Summer Experience at The MathWorks"*, a presentation for Computer Science, Engineering, and Mathematics Scholars (CSEMS) at Tufts University, Medford, MA, November 8, 2006.
- Volunteer, KEYs - Keys to empowering youths, a motivational program for 11-13 year old girls to participate in workshops held periodically throughout the year at MIT, Cambridge, MA, 2002.

MEMBERSHIP

- Mathematical Association of America (MAA) Since 2013
- American Mathematical Society (AMS) Since 2003
- Association for Women in Mathematics (AWM) Since 2003
- Society of Industrial and Applied Mathematics (SIAM) Since 2003
  Activity Groups: Computational Science and Engineering, Imaging Science, Linear Algebra, Materials Science
- United States Association for Computational Mechanics (USACM) 2011 -2013