Maria Emelianenko

CONTACT INFORMATION	Exploratory Hall, Room 4454	*Voice:* (703) 993-9688
	Department of Mathematical Sciences	*Fax:* (703) 993-1491
	George Mason University	*E-mail:* memelian@gmu.edu
	Fairfax, VA 22030 USA	*WWW:* math.gmu.edu/~memelian

RESEARCH INTERESTS

Numerical methods and applied PDE, modeling of nonlinear systems, multigrid methods, optimization, stochastic processes, applications to materials science, physics and biology

FULL-TIME POSITIONS

George Mason University, Fairfax, VA

Professor, Department of Mathematical Sciences	08/2017 – present
Dean's Fellow, College of Science	01/2017 – 05/2018
Associate Professor, Department of Mathematical Sciences	08/2012 – 08/2017
Assistant Professor, Department of Mathematical Sciences	08/2007 – 08/2012
Affiliate Faculty, Computational Materials Science Center	

Carnegie Mellon University, Pittsburgh, PA

CNA Postdoctoral Research Associate, Center for Nonlinear Analysis	08/2005 – 08/2007

Pennsylvania State University, University Park, PA

Research Assistant, Mathematics Department	2003 – 2005
Teaching Assistant/Associate, Mathematics Department	1999 – 2003

VISITING POSITIONS

University of California Los Angeles, IPAM, Los Angeles, CA
Senior Fellow, Core Faculty Participant
Program on Understanding Many-Particle Systems with Machine Learning   09/2016 – 12/2016

Park City Mathematics Institute, Park City, UT
Institute for Advanced Study, Princeton, NJ
Principal Lecturer, Undergraduate Faculty Program
"Mathematics and Materials" PCMI Summer Program   July 2014

University of California Los Angeles, IPAM, Los Angeles, CA
Senior Fellow, Core Faculty Participant
Program on Materials Defects   09/2012 – 12/2012

EDUCATION

Pennsylvania State University, University Park, PA
Department of Mathematics

Ph.D. Mathematics, Minor in High Performance Computing   08/2005

Thesis: "Multilevel and Adaptive Methods for Some Nonlinear Optimization Problems"

Advisor: Prof. Qiang Du

M.A. Mathematics   08/2002

Thesis: "Analysis of Constrained Multidimensional Birth-Death Processes"
Advisor: Prof. N. Gautam

Moscow State University, Moscow, Russia
Department of Computational Mathematics and Cybernetics

M.S. Applied Mathematics, *summa cum laude*   06/2001

Thesis: "Numerical approach to solving Andronov-Hopf and Bogdanov-Takkens systems of differential equations"
Advisor: Prof. A. Bratus

B.S. Computer Science/Math, *summa cum laude* 06/1999

<table>
<tr><td>Grants</td><td>co-PI, GMU Provost seed grant for "Supplemental Funding of Mathematical Sciences PhD Program", to run PhD Industry Immersion Program, $450,000</td><td>2019 – 2021</td></tr>
</table>

Co-PI, "Experimental and Mathematical Discovery for HIV" MDR seed grant, $40,000   2017-18

Co-PI, "Modeling Prospects of Malaria Elimination in Haiti" MDR seed grant, $33,000   2017-18

co-PI, NIST "SURF: Experience for Mason Undergraduates" grant, NIST summer internships for Mason students ($27,000, $18,000)   2016, 2017

co-PI, GMU Provost seed grant for "Supplemental Funding of Mathematical Sciences PhD Program", to jump start PhD Industry Immersion Program, $447,816   2017 – 2019

Senior Personnel (Lead Institution: CMU), NSF conference grant, Applied Mathematics, "Topics in Applied Nonlinear Analysis: Recent Advances and New Trends", $31,500   2016

PI, NSF QED-EXTREEMS grant, $600,000   2014 – 2017
Title: EXTREEMS-QED: Undergraduate Research in Computational and Data-Enabled Mathematics

PI, NSF CAREER grant, Computational and Applied Mathematics, $452,000   2011 – 2017
Title: CAREER: Developing Mathematical Tools for Modeling Complex Materials Systems

co-PI, NSF-MAA RUMC grant, $2,600   2012 – 2013
Title: Undergraduate Mathematics Conference in Washington

Senior Personnel, DTRA Phase II grant, $7,568,564   2012 – 2017
Title: Translational Peptide Research for Personnel Protection

co-PI, NSF REU grant, $334,000   2012 – 2013
Title: REU: Research, Education and Training in Computational Mathematics and Nonlinear Dynamics of Biological, Bio-inspired and Engineering Systems

co-PI, AWM Sonia Kovalevsky Day awards, $1795, $1950   2011, 2012

PI, NSF grant, Computational Mathematics, $267,000   2009 – 2012
Title: Mesoscale Computational Modeling and Analysis of Materials Microstructure

PI, ORAU's Ralph E. Powe Junior Faculty Enhancement Award, $10,000   2009 – 2010
Title: Mesoscale Computational Modeling and Analysis of Materials Microstructure

co-PI, NSF grant for establishing an REU SITE at GMU, $180,000   2009 – 2010
Title: REU: Multidisciplinary REU in Computational Mathematics and Nonlinear Dynamics of Biological, Bio-inspired and Engineering Systems

PI, Summer Research Award, GMU (university-wide competitive grant), $5,200   2008
Title: Mathematics of Materials

<table>
<tr><td>Honors and Awards</td><td>**Research-related:**</td></tr>
</table>

○ Invited talk, 8th Intl. Conference on Multiscale Materials Modeling, Dijon, France, 10/10/2016
○ Plenary address, 9th European Conference on Elliptic & Parabolic Problems Gaeta, Italy 05/26/2016
○ Secretary (elected), SIAM Activity group on Mathematics of Materials   Jan 2014 – Dec 2016
○ PSU Graduate School Alumni Society Early Career Award   2014
○ Mason Emerging Researcher/Scholar/Creator Award   2013
○ Invited tutorial, Materials Defects Program, IPAM, UCLA   September 2012
○ Invited lecture, PIRE lecture series, Carnegie Mellon University, Pittsburgh, PA   March 2012
○ ORAU Ralph E. Powe Junior Faculty Enhancement Award   2009
○ First Place in Poster Competition, Gordon Research conference on Physical Metallurgy   07/2006
○ Travel Award, Gordon Research conference on Physical Metallurgy   07/2006
○ SIAM Student Travel Award, SIAM Meeting, New Orleans   07/2005
○ Honorable Mention in Student Paper Competition, Copper Mountain Conference   04/2005

Teaching-related:
○ Invited presentation, minisymposium on "Implementing Transformational Undergraduate Modeling Experiences" at SIAM Annual Meeting   July 2016
○ Pearson's One Math Professor honoree   Fall 2015
○ Project NExT Fellow (nation-wide competition)   2008 – 2009
○ Dean's Recognition for Outstanding Teaching, CMU   2005
○ Graduate Assistant Outstanding Teaching Award Nomination, PSU   2004
○ Graduate School Teaching Certificate, PSU   2004
○ Teaching with Technology Certificate, PSU   2004
○ Teaching Associate Certificate, Department of Mathematics, PSU   2003

Earlier fellowships and other certificates:
○ Davey Fellowship, Department of Mathematics, PSU   2003
○ Applied Management Principles Certificate, Purdue University   2002
○ Eberly College of Science Fellowship, PSU   1999
○ Moscow City Mayor's stipend for Distinguished Students, Moscow State University   1998
○ Dean's List, Moscow State University   1996 – 1999
○ Dubna Foundation of Science and Education Scholarship   1995 – 1996
○ Highest Distinction ("'Gold Medal'") on graduation from high school   1996

PUBLICATIONS

REFEREED PAPERS AND PROCEEDINGS

37. A. Sazo, C. Torres, P. Ibarra, A. Sanhueza, F. Casas, M. Emelianenko, D. Golovaty, *"Evolution of two-dimensional grain boundary networks implemented in GPU"*, Comp. Mat. Sci., **160** (2019), pp. 315–333

36. A. Sazo, C. Torres, M. Emelianenko, D. Golovaty, *"A Vertex Model of Recrystallization with Stored Energy Implemented in GPU"*, Mater. Res. Express (2019)

35. C. DeMarino, M. L. Pleet, D. Pinto, M. Cowen, J. Erickson, S. S. Docken, N. Russel, B. Reichmuth, T. Phan, Y. Kuang, D. Anderson, M. Emelianenko, F. Kashanchi, *"Differences in Transcriptional Dynamics Between T-cells and Macrophages as Determined by a Three-State Mathematical Model"*, submitted, 2018

34. Refereed book chapter: M. Emelianenko, V. Maggioni, *"Mathematical Challenges in Measuring Variability Patterns For Precipitation Analysis"*, Springer "Mathematics of Planet Earth" (2018)

33. D. Torrejon, M. Emelianenko, *"Generalized master equations for random walks with time-dependent jump sizes"*, SIAM J. Appl. Math., **78**, No. 3 (2018), pp. 1330-1349

32. K. Saleme Ruiz, M. Emelianenko, *"The role of topology in microstructure-property relations: a*

2D DEM-based study", Modelling Simul. Mater. Sci. Eng., **26** (2018) 014001

31. R. Otis, M. Emelianenko, Z-K. Liu, *"Efficient sampling strategies for global energy minimization of multi-component phases with internal degrees of freedom"*, Comp. Mat. Sci., **130** (2017), p. 282-291

30. D. Torrejon, M. Emelianenko, D. Golovaty, *"Continuous time random walk based theory for a one-dimensional coarsening model"*, J. Ellip. Parab. Eq., **2** (2016), p. 183–199

29. I. Yegorov, M. Emelianenko, *"A kinetic approach to modeling general-texture evolution in two-dimensional polycrystalline grain growth"*, Comp. Mat. Sci., **125** (2016), p.224–242

28. I. Yegorov, C. Torres, M. Emelianenko, *"A Boltzmann-type kinetic model for misorientation distribution functions in two-dimensional fiber-texture polycrystalline grain growth"*, Acta Materialia, **109** (2016) p. 230–247

27. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp, S. Ta'asan, *"Recent Developments in Material Microstructure: a Theory of Coarsening"*, Mater. Res. Soc. Symp. Proc., Cambridge Journals, **1753** (2015)

26. C.Torres, M. Emelianenko, D. Golovaty, D. Kinderlehrer, S.Ta'asan,*"Numerical analysis of the vertex models for simulating grain boundary networks"*, SIAM J. Appl. Math., **75(2)** (2015), p. 762–786

25. J. Snider, I. Griva, X. Sun, M. Emelianenko *"Set-based framework for Gibbs energy minimization"*, CALPHAD, **48** (2015), p. 18–26

24. M. Emelianenko, D. Torrejon, M. DeNardo, A. Socolofsky, A. Ryabov, T. Collins, *"Estimation of Rate Constants in Nonlinear Reactions Involving Chemical Inactivation of Oxidation Catalysts"*, J. Math. Chem., **52**, Issue 5 (2014), p. 1460–1476

23. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R.Sharp, and S.Ta'asan *"Materials microstructures: entropy and curvature driven coarsening"*, RIMS Proceedings, U. Kyoto, **1881**, p. 71-91 (2014)

22. Refereed book chapter: K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp and S. Ta'asan, *"A Theory and Challenges for Coarsening in Microstructure"*, Springer INdAM Series, "Analysis and Numerics of Partial Differential Equations", in memory of Enrico Magenes, 2013

21. J. Zhang, M. Emelianenko, Q. Du, *"Periodic centroidal Voronoi tessellations"*, Intern. J. Num. Anal. Modeling, **9**, p.950-969 (2012)

20. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R.Sharp, and S.Ta'asan ,*" Predictive theory for the grain boundary character distribution"*, Materials Science Forum, **715-716**, 2012, p.279–285 (Special Issue on ReX and GG IV)

19. Z. Di, M. Emelianenko, S. Nash, *"Truncated Newton-based multigrid algorithm for centroidal Voronoi calculation"*, Numer. Math. Theor. Meth. Appl., **5**, No. 1, (2012) pp. 242–259

18. A. Baranova, J. Bode, G. Manyam, M. Emelianenko, *"An efficient algorithm for systematic analysis of nucleotide strings suitable for siRNA design"*, BMC Res. Notes, 4(1):168 (2011)

17. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp, S. Ta'asan

"Critical events, entropy, and the grain boundary character distribution", Physical Review B, **83**, 134117 (2011)
Editor's suggestion, with accompanying Viewpoint

16. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp, S. Ta'asan, *"An entropy based theory of the grain boundary character distribution"*, DCDS-A, **30**, no. 2 (2011), p.427–454

15. M. Atkins (mentors: D. Anderson, M. Emelianenko, Y.Mishin), *"A Method of Calculating the Thickness of a Solid-Liquid Interface"*, SIAM Undergraduate Research Online, **3**, 2010

14. M. Emelianenko, *"Fast Multilevel CVT-based Adaptive Data Visualization Algorithm"*, Numer. Math. Theor. Meth. Appl., **3**, No. 2 (2010), p.195-211

13. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, S. Ta'asan, *"Geometric growth and character development in large metastable systems"*, Rendiconti di Matematica, Serie VII, **29**, Roma (2009), 1-13

12. K. Barmak, M. Emelianenko, D. Golovaty, D. Kinderlehrer, and S. Ta'asan., *"A new perspective on texture evolution"*, Intl. J. of Num. Anal. and Modeling, **5**, Supp (Special Issue on Modeling, Analysis and Simulations of Multiscale Nonlinear Systems), 2008, p.93–108

11. K. Barmak, M. Emelianenko, D. Golovaty, D. Kinderlehrer, S. Ta'asan, *"Towards a statistical theory of texture evolution in polycrystals"*, SIAM J. Sci. Comput., **30** No. 6 (2008), p. 3150–3169

10. M. Emelianenko, L. Ju, A. Rand, *"Nondegeneracy and weak global convergence of the Lloyd algorithm in $\mathbb{R}^d$"*, SIAM J. Numer. Anal., **46** Issue 3 (2008), p.1423–1441

9. Q. Du, M. Emelianenko *"Uniform convergence of a nonlinear energy-based multilevel quantization scheme via centroidal Voronoi tessellations"*, SIAM J. Numer. Anal., **46**, Issue 3 (2008), p. 1483–1502

8. K. Barmak, M. Emelianenko, D. Golovaty, D. Kinderlehrer, and S. Ta'asan., *"On a statistical theory of critical events in microstructural evolution"*, Proc. of the 11th International Symposium on Continuum Models and Discrete Systems (CMDS11), Paris, France, 2007

7. Q. Du, M. Emelianenko and L. Ju *"Convergence properties of the Lloyd algorithm for computing the centroidal Voronoi tessellations"*, SIAM J. Numer. Anal., **44**, Issue 1 (2006), p. 102–119

6. M. Emelianenko, Z.-K. Liu, Q. Du *"A New Algorithm for the Automation of Phase Diagram Calculation"*, Comp. Mater. Sci., **35**, Issue 1 (2006), 61-74
[In ScienceDirect Top 25 Hottest Articles]

5. Q. Du, M. Emelianenko *"Acceleration schemes for computing the centroidal Voronoi tessellations"*, Numer. Linear Algebra Appl., **13**, Issue 2-3 (Special Issue on Multigrid Methods) (2006), p. 173–192

4. Q. Du, M. Emelianenko, H.-C. Lee and X. Wang *"Ideal point distributions, best mode selections and optimal spatial partitions via centroidal Voronoi tessellations"*, Proc. 2nd Intl. Symp. on Voronoi Diagrams in Sci. and Engr., Seoul, Korea, Oct 2005 (VD2005), pp. 325-333, 2005

3. Q. Du, M. Emelianenko *"A multilevel energy-based quantization scheme"*, Lecture Notes in Comp. Sci. Eng., **55**, Widlund, Olof B.; Keyes, David E. (Eds.), Springer, Berlin (2007), p.533–541

2. M. Yacoubi, M. Emelianenko and N. Gautam *"Pricing in next generation network queuing model*

to guarantee QoS", Perform. Evaluation, **5**, issue 1 (2003), 59-84
[In Top 10 downloads from Performance Evaluation website in 2003]

1. E.B. Dushanov, M.G. Emelianenko and G.Yu. Konovalova , *"On formats of the representation of real numbers and algorithm for automatic declaration of constants of the computer real arithmetic"*, J. Comput. Meth. Sci. Eng., **2**, issue 1-2 (2002), p.57–62

PUBLICATIONS ON EDUCATION

1. M. Emelianenko, *"Helping Undergraduates See Mathematics in Material World"*, SIAM News, **43**, Number 6, 2010

BOOKS

2. M. Emelianenko, J. Gemmer, D. Kinderlehrer, P. Shipman, "A primer on Mathematical Methods in Materials Science", under contract with SIAM, 2018

1. M. Emelianenko, "Multilevel and adaptive methods for nonlinear optimization problems", VDM-Verlag, 116 pages (2010) ISBN: 978-3-639-22436-8

PREPRINTS, UNREFEREED CONFERENCE PROCEEDINGS

8. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp, S. Ta'asan, *"An Entropy Based Theory of the Grain Boundary Character Distribution"*, Center for Nonlinear Analysis, No. 11-CNA-001, 2011

7. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp, *"Critical Events, Entropy, and the Grain Boundary Character Distribution"*, Center for Nonlinear Analysis, No. 10-CNA-014, 2010

6. K. Barmak, E. Eggeling, M. Emelianenko, Y. Epshteyn, D. Kinderlehrer, R. Sharp, S. Ta'asan, *"Predictive Theory for the Grain Boundary Character Distribution"*, Center for Nonlinear Analysis, No. 10-CNA-013, 2010

5. K. Barmak, M. Emelianenko, D. Golovaty, D. Kinderlehrer, S. Ta'asan, *"On a statistical theory of critical events in microstructure evolution"*, Center for Nonlinear Analysis, No. 07-CNA-005, 2007

4. M. Emelianenko, D. Golovaty, D. Kinderlehrer, S. Ta'asan, *"Texture evolution via continuous time random walk theory"*, Center for Nonlinear Analysis, No. 06-CNA-011, 2006

3. M. Emelianenko, D. Golovaty, D. Kinderlehrer, S. Ta'asan, *"Grain boundary evolution: new perspectives"*, Center for Nonlinear Analysis, No. 06-CNA-010, 2006

2. G.A. Emel'yanenko, M. Emelianenko, T.T. Rakhmonov, E.B. Dushanov, G.Yu. Konovalova, *"On efficiency of critical-component method for solving singular and ill-posed systems of linear algebraic equations"*, preprint JINR, Dubna, Russia, arXiv:math/0108074, 2001

1. G.A. Emel'yanenko, V.N. Samoilov and M.G. Emelianenko *"The uncertainty principle in numerical linear algebra"*, in Proc. Intl. Conf. on Comp. Math. Part I-II, (2002), 104–106, ICMMG, Novosibirsk

PAPERS IN PREPARATION

1. J. Snider, I. Griva, M. Emelianenko, "Vacancies and molar Gibbs energy", in preparation

2. Z. Di, M. Emelianenko, M. Vazquez, P. Houser, V. Maggioni, "CVT-based Rain Gauge Location Prediction", in preparation

GMU SERVICE SUMMARY

1. GMU COS Dean's Fellow, 2017 – 2018
2. Member, Office of Research Computing Advisory Board, 2017 – present

3. Member, University Graduate Scholarship committee, 2017 – 2019

4. GMU COS Executive Council, at-large member, 2016 – 2018

5. GMU COS Nominations Committee, 2009 – 2013

6. GMU Math Graduate Committee, 2015 – present

7. GMU Math Policy & Hiring Committee, 2010 – 2012

8. Coordinator, Provost-sponsored Industrial Immersion Program (IIP) for Math graduate students, 2016 – present

9. PI and Coordinator, NIST-GMU undergraduate internship program (joint grant with Volgenau School of Engineering), 2016 – present

10. PI, GMU EXTREEMS undergraduate research program (involves 27 undergraduate students including 3 Puerto Rico students), 2014 – 2017

11. Organizer, Mason Chapter of Mathematics of Planet Earth SIAM Activity Group (includes members from Math, GGS and Civil Engineering departments)

12. Association for Women in Mathematics club faculty mentor, coordinating Women in Math activities and outreach events between GMU and local schools

13. Research Panel for Pakistan Scholars participant, GMU, April 20, 2016

14. Participant, Bootstrapping Research at Mason Panel, August 2012

15. Participant, GMU COS CAREER panel, April 2012, April 2014, Feb 2019

16. Co-organized 3 undergraduate research conferences (UMC2012, UMC2013, UMC2016)

17. Organized 2 GMU Industrial Modeling workshops (MMD2014, MMD2017)

18. Co-organized 4 research conferences (SIAM MS10, NIST UQ 2016, DelMar 2016, CMU 2016)

19. Co-organized 2 STEM outreach events (Sonia Kovalevsky GMU Middle and High School Mathematics Days)

20. Co-organizer, Applied & Comp. Math seminar, Dept. of Mathematical Sciences, 2007 – 2010

21. Chair, Committee on Departmental Website Redesign, Fall 2009

22. GMU Math Prelim grading and preparation - ODE and Numerical Analysis, 2007 – present

23. GMU Math and SPACS qualifying exam grading and preparation - ODE, PDE, Numerical Analysis, 2007 – present

PROFESSIONAL ACTIVITIES & SERVICE

○ **National scientific conference/workshop organization:**

(9) member of the Organizing committee, International Conference on Multiscale Materials Modeling (MMM 2020), Oct 2020

(8) co-organizer, symposium on "Mathematical Aspects of Materials Science - Modeling, Analysis and Computations", 2019 MRS Spring Meeting
https://www.mrs.org/spring-2019/call-for-papers?code=CP09

(7) member of the Organizing committee, SIAM Conference on Mathematical Aspects of Materials Science (MS18), Portland, OR July 9-13, 2018
http://www.siam.org/meetings/ms18/

(6) Chair of the Organizing committee, Mason Modeling Days workshop (2nd GMU Modeling workshop), George Mason University, Arlington VA June 28-July 1, 2017
∼60 nationwide academic participants from various disciplines
https://sites.google.com/site/masonmodelingdays

(5) co-chair of the Organizing committee (with I. Fonseca, A. Tudorascu, Y. Epshteyn, D. Slepcev) "Topics in Applied Nonlinear Analysis: Recent Advances and New Trends" conference, July 18-20, 2016 at Carnegie Mellon University, Pittsburgh, PA
∼50 participants, poster sessions
https://www.math.cmu.edu/CNA/kinderlehrer75

(4) co-chair of the Organizing committee (with H. Antil and P. Seshaiyer), "DelMar Numerics Day" conference, GMU, May 14, 2016
∼80 participants
http://delmar.math.umd.edu

(3) co-chair of the Organizing committee (with Igor Levin), "Uncertainty Quantification in Materials Science" workshop, NIST, January 14-15, 2016
∼30 participants
http://www.nist.gov/mml/mmsd/workshop-on-quantification-of-uncertainties-in-material-science.cfm

(2) chair of the Organizing committee, Mason Modeling Days workshop (1st GMU Modeling workshop), George Mason University, Fairfax VA June 9-14, 2014
∼40 nationwide academic and industrial participants
https://sites.google.com/site/masonmodelingdays2014

(1) member of the Organizing committee, SIAM Conference on Mathematical Aspects of Materials Science (MS10), Philadelphia on May 23–26, 2010
∼400 participants http://www.siam.org/meetings/ms10

○ **Professional development workshop organization:**
(5) chair of the Organizing committee, AWM Career workshop, SIAM Annual Meeting, Boston MA, July 2016 (∼40 participants, a 2-day event including 2 research minisymposia, career panel and poster session)

(4) chair of the Organizing committee, SIAM Professional Development Evening, SIAM CSE15, Salt Lake City, UT March 2015 (∼100 participants, a 3-hour event with 2 panel discussions and a networking session)

(3) co-organizer, SIAM Professional Development Evening, SIAM Annual Meetings 2013, 2014 (∼100 participants, a 3-hour event with 2 panel discussions and a networking session)

(2) co-organizer, AWM workshop, SIAM Annual Meeting, San Diego CA July 2013 (∼40 participants, 2-day event including 2 research minisymposia, career panel and poster session)

(1) co-organizer, "AWM Workshop: Opportunities Beyond Academia", ICIAM, Vancouver, Canada, July 2011 (∼40 participants, a 2-day event including 2 research minisymposia, career panel and poster session)

○ **Undergraduate research conference organization:**
(4) co-organizer, Undergraduate Mathematics Conference in Washington (UMC), College of William & Mary, Williamsburg, VA, April 8, 2017 (∼20 participants)

(3) co-organizer, Undergraduate Mathematics Conference in Washington (UMC), George Washington University, Washington, DC, April 2, 2016 (∼30 participants)

(2) chair of the Organizing committee, Undergraduate Mathematics Conference in Washington (UMC), George Mason University, Fairfax VA, April 6, 2013 (∼30 participants)

(1) co-organizer, Undergraduate Mathematics Conference in Washington (UMC), George Washington University, Washington, DC April 21-22, 2012 ($\sim$30 participants)

- ○ **Minisymposium organization:**

  (14) organizer, "Advances in mathematical modeling of complex materials systems", SIAM symposium session, JMM Baltimore, Jan 2019

  (13) co-organizer, "Advances in CALPHAD Methods" minisymposium, SIAM MS18, Portland, OR, July 2018

  (12) co-organizer, "Coarsening in microstructure" minisymposium, SIAM MS18, Portland, OR, July 2018

  (11) organizer, "Advances in mathematical modeling of biomedical problems" minisymposium, SIAM SEAS, UNC Chapel Hill, March 10-11, 2018

  (10) co-organizer, "Mathematical advances in hydrology: non-stationarity and data assimilation" minisymposium, SIAM Mathematics of Planet Earth conference, Philadelphia, Sept 2016

  (9) co-organizer, "Recent developments in analytical and numerical modeling of recrystallization, grain growth and related phenomena" minisymposium, SIAM MS16, Philadelphia, May 2016

  (8) co-organizer, "Mathematical challenges in phase diagram calculation" minisymposium, SIAM MS16, Philadelphia, May 2016

  (7) co-organizer, "Advances in multigrid methods and their applications", minisymposium, SIAM CSE15, Salt Lake City, UT March 2015

  (6) co-organizer, "Recent Advances in Studies and Applications of Centroidal Voronoi Tessellations" minisymposium for ICIAM, Vancouver, Canada, July 2011

  (5) member of the Organizing committee, organizer of a minisymposium on Undergraduate Research, co-organizer of a minisymposium on interface kinetics, SIAM Conference on Mathematical Aspects of Materials Science (MS10), Philadelphia, PA, May 23 - 26, 2010

  (4) co-organizer, "Kinetic Approaches in Materials Science" minisymposium for 2009 SIAM Conference on Analysis of PDEs, Miami, FL, Dec. 7-10, 2009

  (3) co-organizer, "Recent Advances in Algorithms and Applications of Centroidal Voronoi Tessellation and Optimal Quantization" minisymposium for 2008 SIAM Annual Meeting, San Diego, CA,July 7-11, 2008

  (2) co-organizer, "Grain Boundary Evolution" minisymposium for SIAM Conference on Mathematical Aspects of Materials Science(MS08), Philadelphia on May 11–14, 2008

  (1) co-organizer, "Centroidal Voronoi Tessellations: Theory, Algorithms and Applications" minisymposium for SIAM Workshop on Combinatorial Scientific Computing (CSC07), Costa Mesa, CA, Feb 17–19, 2007

- ○ **Editorial board service**

  Associate Editor, SIAM Undergraduate Research Online (SIURO), 2013 - present

- ○ **Regular referee for:**

  Model. and Simulation in Mater. Sci. and Engr., CALPHAD, Intl. J. Num. Methods in Fluids, Mathematical Reviews, Pattern Recognition, Trans. Visualization and Comp. Graphics, SIAM Multiscale Modeling and Simulation, J. of Computational Physics, J. Engr. Mathematics, SIGGRAPH Proceedings, Computer Aided Design, Applied Mathematical Modeling, SIAM J. Applied Math, SIAM J. Num. An., SIAM J. Cont. Optim., Acta Crystallographica

- ○ **Panel participation:**

  COS Research Forum panel, GMU, Feb 2017

Research Panel for Pakistan Fellows, GMU, April 2016

Panel on education, invited member, IMA Materials Genome workshop, Sept 2012

SIAM Forward Looking Session, invited panel member, SIAM Mathematics of Materials Meeting, May 2010

NSF panels: May 2009, March 2010, March 2011, March 2012, October 2014, June 2015, June 2016, April 2017

NSF Committee of Visitors: February 2013

○ **Undergraduate research activities:**

PI, GMU QED-EXTREEMS program, 2014 - 2018

Associate Editor, SIAM Undergraduate Research Online (SIURO), 2013 - present

Co-PI, GMU REU: Research, Education and Training in Computational Mathematics and Nonlinear Dynamics of Biological, Bio-inspired and Engineering Systems, 2012 – 2013

Co-PI, GMU Multidisciplinary REU Program in Computational Mathematics and Nonlinear Dynamics of Biological, Bio-inspired and Engineering Systems, 2009-2010

Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS) student mentor, GMU, 2008 – 2013

Summer Undergraduate Applied Math Institute student mentor, CMU, May 30 – July 17, 2007

○ **Scientific community service**
Long-term engagements:

Secretary (elected), SIAM Activity group on Mathematics of Materials, Jan 2014 – Dec 2016

Member, SIAM Education Committee working group on Professional Development, 2012 – 2015

Lecturer, Undergraduate Faculty Program, Park City Mathematical Institute/Institute for Advanced Study, Park City, UT   June - July 2014

One-time commitments:

co-Organizer, SIAM Professional Development Evening, SIAM Annual Meeting   July 2013, July 2014, March 2015 (CSE15)

Panelist, "Building the Materials Data Infrastructure" workshop, Arlington VA, Jan 21, 2015

"Helping undergraduates see mathematics in the material world", invited paper for SIAM News, Volume 43, Number 6   2010

○ **Outreach activities**
Long-term engagements:

Chair, AWM SIAM Workshop sub-committee, 2015–2017

Member, AWM Meetings Committee, 2015 – 2018

co-PI, Sonia Kovalevsky GMU Middle and High School Mathematics Day, May 20, 2011 and May 4, 2012

Member, AWM SIAM Workshop Committee, 2010 – 2013

Mason representative, Centreville High School Women in Mathematics club (panel participation: March 2013, April 2014, March 2016; Mason field trip co-organizer: March 2015)

Faculty advisor, GMU AWM Chapter, 2011 – present

Faculty member, Women in Scientific DOMains, GMU 2007 – 2012

Member, Women of Mathematics group, PSU 2000 – 2005

One-time commitments:

Speaker, AWM Career workshop, SIAM CSE15, Salt Lake City, UT March 2015

Panelist, GWU AWM Networking event, April 2014

Faculty panel participant, GMU Graduate student career workshop, Nov 2011

Speaker, GWU Summer Program for Women in Mathematics, June 2011

Panelist, Women in Science group, CMU 2006

Sponsored participant, "Career Options for Women in Mathematics" workshop, IMA, Minneapolis, Feb 4-5, 2005

○ **Teaching innovation:**

Participant, GMU SIMPLE Teaching Development Project, 2015 – present

Developed 3 new undergraduate and 3 new graduate topics courses on mathematical aspects of materials science and data science

Co-author of an undergraduate textbook on Mathematical Methods in Materials Science, under contract with SIAM Book Acquisitions

○ **Professional memberships:**

Affiliate faculty, Center for Computational Materials Science (CMaSC)

Associate, Computational Materials Science Network (CMSN)

Societies: SIAM, AMS, MAA, AWM. Member of SIAG on Materials Science, Uncertainty Quantification, Mathematics of Planet Earth.

PRESENTATIONS FOR BROADER AUDIENCE

· "Modeling initiatives for upper-level math majors: looking back, forward and across time scales", invited talk at the minisymposium entitled "Implementing transformational undergraduate modeling experiences", SIAM Annual Meeting, Boston, July 11-14, 2016

· "New age of mathematics: more than meets the eye", Honors college seminar talks, 2015, 2017

· "The road less traveled: an interdisciplinary mathematician's journey", AWM workshop talk, SIAM CSE15, Salt Lake City, UT, March 2015

· "Modeling materials and beyond", SIAM Faculty Symposium, GMU, October 2014

· "Mathematics under the Microscope", GWU Summer Program for Women in Mathematics, June 2011

· "Mathematics under the Microscope", GMU Undergraduate Research in Computational Mathematics program, June 2011

· "A mathematician's journey: what matters and why", PSU SIAM chapter presentation, University Park, PA, May 2011

· Keynote speaker, annual PSU Graduate Open House/Alumni Conference, March 29, 2008

· "Crossing boundaries and shaping the world: interdisciplinary math approach", Women In Scientific DOMains meeting, GMU, Dec. 4, 2007

INVITED RESEARCH PRESENTATIONS

· "The role of PDEs and integro-differential equations in biomedical and materials models", invited colloquium, Informatics Department, UTFSM, Chile, October 11, 2018

· "Random walks in materials modeling", invited minisymposium talk, SIAM MS18, July 2018

· "Kinetic Modeling of Materials Coarsening", Applied Math seminar, UCSD, December 1, 2016

· "Kinetic Modeling of Materials Coarsening", invited keynote talk, IPAM workshop, UCLA, October 25, 2016

· "Kinetic Modeling of Materials Coarsening: from individual grains to network statistics", keynote talk, 8th International Conference on Multiscale Materials Modeling taking place in Dijon, France, on October 9-14, 2016

- "Using SVD and CVT to Study Precipitation Patterns in U.S.", minisymposium talk, SIAM MPE16, Philadelphia, Oct 1, 2016
- "PDE-based Modeling of Coarsening in Polycrystals", plenary talk, 9th European Conference on Elliptic and Parabolic Problems, Gaeta, Italy, May 23-27, 2016
- "Kinetic Modeling of Crystalline Misorientation Distribution Functions During Coarsening", workshop presentation, Fields Institute Toronto, ON April 28, 2016
- "Kinetic Modeling of Coarsening in Polycrystals", Applied Math seminar, WVU, March 4, 2016
- "Simulating and predicting statistical features of crystal growth in polycrystalline materials", US Naval Academy, Annapolis, MD, Oct. 13, 2015
- "The role of statistics in mesoscale mathematical modeling of coarsening in polycrystals", Statistics seminar, Sept. 11, 2015
- "PDE-based modeling of coarsening in polycrystalline materials", minisymposium talk, AWM Research Symposium, U. of Maryland, March 2015
- "Optimization challenges in phase diagram calculation", minisymposium talk, AMS Sectional Meeting, Georgetown University, March 2015
- "Advances in multiscale mathematical modeling of materials: from phase diagrams to interface dynamics", minisymposium talk, AVS-61 Symposium, Baltimore MD, November 2014
- "Computational modeling of polycrystals: accuracy and sensitivity analysis", minisymposium talk, JMM, Baltimore MD, January 2014
- "Centroidal Voronoi Tessellations: from Lloyd method to multigrid and beyond", Numerical Analysis seminar, University of Maryland, College Park, September 2013
- "Modeling rare events in microstructure evolution", Mesoscale and Continuum Scale Modeling of Materials Defects workshop, IPAM, UCLA November 2012
- "Mathematical modeling of polycrystals", IMA Special Workshop, Mathematics and the Materials Genome Initiative, Minneapolis, September 2012
- "Mathematical modeling of interfacial dynamics in polycrystals", Materials Defects Tutorial, IPAM, UCLA September 2012
- "Mesoscopic modeling of grain growth", minisymposium talk, SES meeting, Atlanta GA October 2012
- "Computational modeling of coarsening in polycrystalline materials, poster presentation, OCI CAREER Workshop, Arlington, VA June 2012
- "Coarsening in materials: new takes on an old problem", invited talk, PSU, State College, PA April 2012
- "Modeling rare events in microstructure evolution", invited lecture, PIRE lecture series, Carnegie Mellon University, Pittsburgh, PA March 2012
- "Advances in multiscale modeling of coarsening in materials", invited talk, PDE seminar, University of Maryland, College Park, March 2012
- "Constrained optimization approach to multicomponent phase diagram calculation", invited seminar, Beijing International Center for Mathematical Research (BICMR) at Peking University thematic program on "Mathematical Theory and Simulation of Phase Transitions ", November 2011
- "Advances in Multiscale Kinetic Modeling of Grain Growth in Polycrystals", minisymposium talk, AMS Sectional Meeting, Salt Lake City, Utah, October 2011
- "Advances in Multiscale Kinetic Modeling of Grain Growth in Polycrystals", minisymposium talk, SES Annual Meeting, Northwestern University, Chicago, IL October 2011

- "Advances in Kinetic Modeling of Grain Growth in Polycrystalline Materials", minisymposium talk, ICIAM, Vancouver, Canada, July 2011
- "Advances in Multiscale Kinetic Modeling of Grain Growth in Polycrystals", Workshop on Macroscopic Modeling of Materials with Fine Structure, Carnegie Mellon University, Pittsburgh PA May 2011
- "Towards a Unified Statistical Theory of Texture Evolution in Polycrystals", minisymposium talk, SIAM MS10, Philadelphia, PA, May 23-26, 2010
- "Fast Multilevel CVT-based Adaptive Data Visualization Algorithm", invited talk, CS department, GMU, April 13, 2010
- "Kinetic Approaches in Mesoscale Modeling of Polycrystals", minisymposium talk, SIAM PD09, Miami, FL, Dec 8, 2009
- "Mesoscale theory of texture evolution in polycrystals", invited talk, Applied Math colloquium, UMBC, Dec. 4, 2009
- "Mesoscale modeling of materials microstructure", invited talk, Applied Math seminar, University of Delaware, Oct. 27, 2009
- "Kinetic Theories in Multiscale Modeling of Polycrystals", invited talk, Multiscale Modeling and Simulation of Materials minisymposium, SIAM-SEAS Annual Meeting, U. South Carolina, April 4, 2009
- "Kinetic Theories in Multiscale Modeling of Polycrystals", invited talk, FRG workshop on Kinetic Description of Multiscale Phenomena: Modeling, Theory and Computation, U. of Maryland, College Park, March 4, 2009
- "Nonlinear dynamical phenomena in mesoscale modeling of polycrystals", special session presentation, AMS Annual meeting, Washington, DC, Jan 8, 2009
- "Voronoi diagrams, quantization and clustering: theory and applications", invited colloquium talk, George Mason University, Fairfax, VA, Oct 17, 2008
- "Understanding stochastic events in microstructure evolution", invited colloquium talk, Georgetown University, Washington, DC, Oct 3, 2008
- "Understanding stochastic events in microstructure evolution", invited talk, PDE seminar, U. Maryland, College Park, Oct 2, 2008
- "Understanding stochastic events in microstructure evolution", Research Colloquium in Computational Materials Science, GMU, April 14, 2008
- "Mesoscale modeling of polycrystals: understanding stochastic events in microstructure evolution", Applied Mathematics seminar, GWU, April 10, 2008
- "On a statistical theory of critical events in miscrostructure evolution", Math Department Colloquium, Florida State University, Nov. 9, 2007
- "Microstructure Evolution: Recent Progress and Open Questions", Applied Math seminar series, GMU, Sept. 21, 2007
- "On a statistical theory of critical events in miscrostructure evolution", Computational & Data Sciences Colloquium, GMU, Sept. 20, 2007
- "Centroidal Voronoi tessellations: concepts and applications", Undergraduate Colloquium series, CMU, Pittsburgh, PA, April 12, 2007
- "Texture evolution: mathematical aspects", MIMP Seminar, MRSEC, CMU, Pittsburgh, PA, March 27, 2007
- "Centroidal Voronoi tessellations: theory and applications", invited talk, CSUCI, Camarillo, CA, Feb 16, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, US Naval Academy, Anapolis, MD, Feb 9, 2007

- "Mathematical modeling and simulation of texture evolution", invited talk, Clarkson Univ., Potsdam, NY, Feb 5, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, American Univ., Washington, DC, Feb 2, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, Purdue Univ., West Lafayette, IN, Jan 31, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, U. Tennessee, Knoxville, TN, Jan 29, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, George Mason Univ., Fairfax, VA, Jan 26, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, Illinois Inst. Tech., Chicago, IL, Jan 22, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, U. Minnesota, Minneapolis, MN, Jan 19, 2007
- "Mathematical modeling and simulation of texture evolution", contributed talk, Joint AMS Meetings, New Orleans, LA, Jan 4-8, 2007
- "Mathematical modeling and simulation of texture evolution", invited talk, U. Akron, Akron, OH, Dec 13, 2006
- "Mathematical modeling and simulation of texture evolution", invited talk, U. Pittsburgh, Pittsburgh, PA, Dec 5, 2006
- "Mathematical Modeling and Simulation of Texture Evolution", invited presentation, A Conference on Applied Analysis on the Occasion of the 65th Birthday of David Kinderlehrer, CNA, CMU, Pittsburgh, PA, Oct 19 - 21, 2006
- "Mathematical modeling and simulation of the grain boundary character distribution", invited poster presentation, Gordon Research Conference on Physical Metallurgy, Plymouth, NH, July 23-28, 2006
- "Uniform convergence of a nonlinear energy-based multilevel quantization scheme via centroidal Voronoi tesselations", minisymposium talk, Joint MAA-SIAM Meeting, Auburn, AL, March 31-April 2, 2006
- "A nonlinear energy-based multilevel quantization scheme", invited talk, Frontiers in Nonlinear Analysis, CNA, CMU, Pittsburgh, Sept 8-10 ,2005
- "Uniform convergence of a multilevel energy-based quantization scheme", invited talk, Minisymposium on centroidal Voronoi tessellations, New Orleans, July 11-15 ,2005
- "A New Algorithm for the Automation of Phase Diagram Calculation", invited talk, MCSD Seminar Series, NIST, Gaithersburg, MD, March 22, 2005

CONTRIBUTED
PRESENTATIONS
- "The role of PDEs and integral equations in biomedical modeling", minisymposium talk, SIAM SEAS, UNC Chapel Hill, March 2018
- "Novel multilevel CVT-based data binning algorithms", minisymposium talk, ICIAM, Vancouver, Canada, July 2011
- "Mesoscale Modeling of Polycrystals", minisymposium talk, SIAM Annual Meeting, Pittsburgh, PA July 2010
- "Texture evolution: new perspectives", poster presentation, 4th Intl. Multiscale Materials Modeling conference, Florida State University, Tallahassee, FL, Oct 27-31, 2008
- "Voronoi-Based Binning Techniques: Acceleration Methods and Applications", minisymposium talk, SIAM Annual Meeting, San Diego, July 2008

- "Mesoscale modeling of polycrystals: interplay of theory and simulation", minisymposium talk, SIAM MS08, Minisymposium on Grain Boundary Evolution, May 11, 2008
- "Mathematical modeling and simulation of texture evolution", poster presentation, Barrett Lectures, U. Tennessee, Knoxville, TN, April 29-30, 2007
- "Multidimensional Energy-based Multilevel Quantization Scheme and its Applications", minisymposium talk, SIAM CSE07, Costa Mesa, CA, February 19-23, 2007
- "Toward a Statistical Theory of Texture Evolution", contributed talk, SIAM CSE07, Costa Mesa, CA, February 19-23, 2007
- "A Nonlinear Energy-based Multilevel Quantization Scheme", contributed talk, XII Copper Mountain Conference on Multigrid Methods, Colorado, April 3-8, 2005
- "Uniform convergence of a multigrid energy-based quantization scheme", poster presentation, IMA Workshop: Career Options for Women in Mathematics, Univ. of Minnesota, Minneapolis, MN, February 4-5, 2005
- "Uniform Convergence of a Multigrid Energy-based Quantization Scheme", poster presentation, 16th International Conference on DDM, Courant Institute, January 12-15, 2005
- "A New Algorithm for the Automation of Phase Diagram Calculation", poster presentation, NSF Division of Materials Research ITR Computational Workshop, UIUC, Urbana, IL, June 17-19, 2004

STUDENTS/POSTDOCS SUPERVISED AT GMU:

- Postdocs:
  4. Katerine Salemeruiz (2016-2017)
  3. Ivan Yegorov (2015-2016)
  2. Claudio Torres (2012-2013)
  1. Boris Gafurov (2011-2012)

- Graduate students:
  7. Tracey Oellerich (advisor, IIP program project, current)
  6. Jeff Snider (co-advisor, PhD thesis, current)
  5. Diego Torrejon (advisor, PhD thesis, defended Dec 2017)
  4. Zichao Di (co-advisor, PhD thesis, defended Aug 2013)
  3. Hasitha de Silva (advisor, research project 2010-2012)
  2. Jonathan Bode (research project co-advisor, 2010-2011)
  1. Thomas Stephens (advisor, research project, 2010-2011)

- Undergraduate students:
  Robert Argus (advisor, EXTREEMS research project, 2015-2016)
  Daniel Sun (co-advisor, summer research project, Summer 2012)
  Matthew Farkas (advisor, REU research project, Summer 2012)
  Matthew Villemarette (co-advisor, REU research project, Summer 2012)
  Alex Price (co-advisor, REU research project, Summer 2012)
  Diego Torrejon (co-advisor, CSUMS research project 2011-2012)
  Michael Sharov(co-advisor, CSUMS research project 2011-2012)
  Russell Mahoney (advisor, CSUMS research project 2010-2011)
  Robert Hill (co-advisor, CSUMS research project 2010-2011)
  Tom Stephens (co-advisor, CSUMS research project 2008-2009)
  Mike Atkins (co-advisor, CSUMS research project, 2008-2009)
  Joshua Snyder (advisor, CSUMS research project, 2009-2010)
  Sandra Varela (co-advisor, REU research project, Summer 2010)

Ross Kistler (advisor, REU research project, Summer 2010)

Charles Cook, Alma College (advisor, REU research project, Summer 2009)

Angela Dapolite, Clarkson University (advisor, REU research project, Summer 2009; advisor, Honors thesis, 2010)

○ Member of dissertation committees: Manal Othman (Ph.D. thesis committee, Bioinformatics GMU, current), Jennifer Roames (M.S. thesis committee, Physics GMU, current), Yukiko Yarnall (M.S. thesis committee, Math, GMU, defended Spring 2016), Jessica O'Connor (Ph.D. thesis committee, Physics, GMU, defended Spring 2016), Michael Crone (Ph.D. thesis committee, Math GMU, defended Fall 2014), Veronica Bloom (Ph.D. thesis committee, CSI GMU, defended Spring 2014), Alexander Koufos (Ph.D. committee, CSI GMU, defended Spring 2015), Lei Wang (Ph.D. committee, Systems Biology GMU, current), Hypnos Hu (Ph.D. committee, CSI GMU, defended Spring 2015), Jieun Lee (Ph.D. thesis committee, George Washington University, Mathematics, defended May 2010), TJ Flynn (M.S. thesis committee, GMU Mathematics, defended Spring 2009), Mary Ann Graham (M.S. thesis committee, GMU Mathematics, defended Fall 2007), Ganga P. Purja Pun (Ph.D. thesis committee, GMU Physics, defended Fall 2011)

STUDENTS SUPERVISED AT CMU	Tarek Elgindi (University of Wisconsin, REU student, CMU, Summer 2007), Morgan Shaffer (Mount Holoyoke College, REU student, CMU, Summer 2007), Michelle Baker (Shippensburg University, REU student, CMU, Summer 2007), Jian Wang (UT Knoxville, REU student, CMU, Summer 2007), Keith Rogers (Alabama State, REU student, CMU, Summer 2007), Alexander Chun (Northwestern University, REU student, CMU, Summer 2007)

TEACHING EXPERIENCE

At George Mason University:
Math 493/689 (NEW senior/grad topics course) Diff. Eq. and UQ in Data Science - Fall 2018
Math 689 (NEW grad topics course) Multiscale Methods - Spring 2016
Math 493/689 (NEW senior/grad topics course) Math. Methods in Materials Science - Spring 2015
Math 625 (graduate) - Numerical Linear Algebra - Spring 2019
Math 290 (sophomore) Intro to Advanced Math - Spring 2013
Math 114 (freshman) Calculus II - Spring 2013, Fall 2015
Math 678 (grad core) Partial Differential Equations - Fall 2011
Math 113 (freshman) Calculus I - Spring 2011, Fall 2011, Fall 2014
Math 214 (sophomore) Elementary Differential Equations - Fall 2008, Fall 2010, Spring 2011, Spring 2014, Spring 2016, Spring 2017, Spring 2019
Math 413 (senior) Introduction to Applied Mathematics I - Fall 2010, Fall 2014, Fall 2017
Math 414 (senior) Introduction to Applied Mathematics II - Spring 2015, Spring 2018
Math 685/CSI 700 (grad) Numerical Methods - Spring 2008, Spring 2010
Math 677 (grad core) Ordinary Differential Equations - Fall 2009
Math 446/OR 481 (senior) Introduction to Numerical Analysis - Fall 2007

At Carnegie Mellon University:
Math 21-369 (junior) Numerical Mathematics and Computing - Fall 2005, Fall 2006

At Penn State University:
Math250 (sophomore) Ordinary Differential Equations - Spring 2004
Math251 (sophomore) Ordinary and Partial Differential Equations - Fall 2002, Spring 2002
Math231 (sophomore) Calculus of Several Variables - Fall 2001
Math220 (sophomore) Matrices - Spring 2001
Math22 (freshman) College Algebra II and Analytic Geometry - Fall 2000, Spring 2000
Math21 (freshman) College Algebra I - Summer 2000, Summer 2001