Jiahua Jiang

Curriculum Vitae

Department of Mathematics
225 Stanger Street Blacksburg, VA 24061
508-971-6287
jiahua@vt.edu
https://intranet.math.vt.edu/people/jiahua/home.html

Academic Positions

Sept.2018 – **Postdoctoral Associate**, *Department of Mathematics, Virginia Tech.*
Advisor: Julianne Chung

Education

Sept.2013 – Aug.2018 **University of Massachusetts Dartmouth**, *Ph.D. Computational Science and Engineering.*
Major: Computational Mathematics
Advisors: Prof. Yanlai Chen and Prof. Akil Narayan
Thesis: Reduced Basis Methods and Hybridizable Discontinuous Galerkin method for efficient forward solvers
GPA – 3.98/4.0

Sept.2009 – June.2013 **University of Science and Technology of China**, *B.S. Mathematics.*
Major: Computational Mathematics
Advisor: Prof. Xianjin Chen

Research Interests

Inverse Problem, Image Processing, Deep Learning, Reduced Order Modeling, Uncertainty Quantification, Discontinuous Galerkin, Optimization

Research Experience

Jan.2020 - May.2020 **Visiting Scholar, ICERM, Brown University**, *Providence*, RI.

June.2016 - Aug.2016 **Research Intern, Sandia National Laboratories**, *Livermore*, CA.
- Project 1
  - Topic: *Andersen acceleration for domain decomposition methods in uncertainty quantification*
  - Supervisors: Dr. Kevin Carlberg & Dr. Khachik Sargsyan & Dr. Mohammad Khalil
- Project 2
  - Topic: *Multigrid for domain decomposition methods in uncertainty quantification*
  - Supervisors: Dr. Kevin Carlberg & Dr. Ray Tuminaro

Sept.2013 - Aug.2018 **Research Assistant, University of Massachusetts Dartmouth**, *North Dartmouth*, MA.
- Topic: *Reduced Basis Methods for Uncertainty Quantification Problems*
- Supervisors: Prof. Yanlai Chen & Prof. Akil Narayan

July.2015 **Industrial Math/Stat Modeling Workshop for Graduate Students**, *SAMSI & North Carolina State University*, NC.
- Topic: *A Flexible Methodology for Optimal Helical Compression Spring Design*
- Supervisors: Dr. Jordan Massad & Dr. Sean Webb (Sandia National Lab)
  Prof. Ilse Ipsen & Prof. Ralph Smith (North Carolina State University)

Awards & Recognitions

2020 SIAM Early Career Travel Award for SIAM Conference on Imaging Science
2019 SIAM Early Career Travel Award for ICIAM 2019
2019 Travel Support from NSF and Oberwolfach for Conference:Tomographic Inverse Problem
2018 Best Poster Award at International Conference on Mathematics of Data Science 2018
2018 AWM Workshop Travel Grant for SIAM Annual Meeting 2018
2015-2018 SIAM Student Travel Grant for ICIAM 2015, UQ 2016, 2018, Annual Meeting 2016–2018
2017 Travel Award for 14th U.S. National Congress on Computational Mechanics
2017 SIAM CSE17 Best Minisymposterium Awards (thematic group of posters)
2015-2017 Sustainable Horizons Institute Travel Award for SIAM CSE 2015, 2017
2013-2016 Distinguished Doctoral Fellowship at UMass Dartmouth

2015-2016 In recognition of outstanding efforts and accomplishments on behalf of the SIAM Chapter at the UMass Dartmouth

2015 Travel Grant from Argonne National Lab for PETSc 20

2014-2015 AWM Workshop Travel Grant for SIAM CSE 2015 and Women Institute in Summer Enrichment 2014

2013 Outstanding Undergraduate Thesis Award

2009 First Place at Chinese Mathematical Olympiad

Publications

Journal papers

[1] J. Jiang, Y. Chen and A. Narayan, *A Goal-oriented Reduced Basis Methods-accelerated Generalized Polynomial Chaos Algorithm,* SIAM/ASA Journal on Uncertainty Quantification, 4(1), 2016, pp. 1398-1420, [arXiv:1601.00137]

[2] J. Jiang, Y. Chen and A. Narayan, *Offline-enhanced Reduced Basis Method through Adaptive Construction of the Surrogate Training Set*, Journal of Scientific Computing, Special Issue in Honor of the 60th Birthday of Chi-Wang Shu, 73(2-3), 2017, pp. 853–875. [arXiv:1703.05683]

[3] B. Dong, J. Jiang and Y. Chen, *Optimally Convergent Hybridizable Discontinuous Galerkin Method for Fifth-order Korteweg-de Vries Type Equations*, Mathematical Modeling and Numerical Analysis (ESAIM: M2AN), 52(6), 2019, pp. 2283 - 2306. [arXiv:1710.07734]

[4] Y. Chen, J. Jiang and A. Narayan, *Robust Residual-based and Residual-free Greedy Algorithms for Reduced Basis Methods*, Computers & Mathematics with Applications (CAMWA), 77(7), 2019, pp. 1963-1979. [arXiv:1710.08999]

[5] J. Jiang, Y. Chen, *Multi-level adaptive greedy algorithms for the reduced basis method*, Accepted in International Journal for Numerical Methods in Engineering. [arXiv:1911.02214]

[6] J. Chung, E. Sturler, J. Jiang*, *Hybrid Projection Methods with Recycling for Inverse Problems*, [Submitted]. [arXiv:2007.00207]

[7] Taewon Cho, Julianne Chung, J. Jiang*, *Hybrid Projection Methods for Large-scale Inverse Problems with-Mixed Gaussian Priors*, [Submitted]. [arXiv:2003.13766]

[8] Ruchi. Guo and J. Jiang*, *Construct Deep Neural Networks Based on Direct Sampling Methods for Solving Electrical Impedance Tomography*, [Submitted]. [arXiv:2009.08024]

[9] Y. Chen, J. Jiang* and Xingjie Li, *Empirical Interpolation Method Enhanced Bayesian Quadrature Rules*, [In preparation]

Technical report

[10] A Flexible Methodology for Optimal Helical Compression Spring Design, Technical Report of the Industrial Math/Stat Modeling Workshop for Graduate Students, 2015, pages 1-17 in the pdf file

Thesis

[11] J. Jiang, *Reduced Basis Methods and Hybridizable Discontinuous Galerkin Method for Efficient Forward Solvers,* PhD dissertation, 2018

Certification

Coursera Practical Machine Learning, License: 3RYEZ6KYUJNP

Conferences & Presentations

Talks at conference & workshops

2020 **SIAM Conference on Imaging Science**, *Canada*.

2020 **XXI Householder Symposium on Numerical Linear Algebra**, *Italy*.

2019 **Conference on Modern Challenges in Imaging, In the Footsteps of Allan MacLeod Cormack On the Fortieth Anniversary of his Nobel Prize**, *Tufts University*.

2019 **ICIAM: The 9th International Congress on Industrial and Applied Mathematics**, *Spain*.

2019 **3rd International Conference on Uncertainty Quantification in Computational Sciences and Engineering**, *Greece*.

2019 **Applied Inverse Problems Conference**, *France*.

2019 **Approximation Theory 16**, *Vanderbilt University*.
2019 **New England Numerical Analysis Day**, *Worcester Polytechnic Institute*.
2019 **East Coast Optimization Meeting**, *George Mason University in Fairfax, VA*.
2019 **Joint Mathematics Meetings**, *Baltimore*.
2018 **East Lake International Forum for Outstanding Overseas Young Scholars**, *China*.
2018 **13th World Congress on Computational Mechanics** , *New York*.
2018 **SIAM Conference on Uncertainty Quantification**, *California*.
2018 **Applied Math Days**, *Rensselaer Polytechnic Institute*.
2016 **SIAM Annual Meeting**, *Boston*.
2016 **Applied Math Days**, *Rensselaer Polytechnic Institute*.
2015 **ICIAM: The 8th International Congress on Industrial and Applied Mathematics**, *Beijing, China*.
2015 **Applied Math Days**, *Rensselaer Polytechnic Institute*.

Invited colloquium & seminars

2020 **Seminar**, *Oak Ridge National Laboratory*.
2019 **Colloquium**, *University of Science and Technology of China*.
2019 **Colloquium**, *Virginia Tech*.
2019 **Applied Numerical Analysis Seminar**, *Virginia Tech*.
2018 **Colloquium**, *Shanghai Normal University*.
2018 **Colloquium**, *ShanghaiTech University*.
2018 **Applied Numerical Analysis Seminar**, *Virginia Tech*.
2017 **Colloquium**, *Worcester Polytechnic Institute*.
2017 **Colloquium**, *ShanghaiTech University*.
2017 **Colloquium**, *University of Science and Technology of China*.
2015 **Colloquium**, *Tufts University, MA*.

Posters

2019 **Computational Imaging**, *ICERM at Brown University*.
2018 **Second International Conference on Mathematics of Data Science**, *Old Dominion University in Norfolk, VA*.
2018 **Women's Intellectual Network Research Symposium**, *University of Virginia, VA*.
2018 **SIAM Annual Meeting**, *Portland, Oregon*.
2017 **14th U.S. National Congress on Computational Mechanics**, *Montreal, Canada*.
2017 **SIAM Annual Meeting**, *Pittsburgh, Pennsylvania*.
2017 **SIAM Workshop on Parameter Space Dimension Reduction**, *Pittsburgh, Pennsylvania*.
2017 **A workshop in honor of the birthdays of Charles L. Epstein and Leslie Greengard: Modern Advances in Computational and Applied Mathematics**, *Yale University*.
2017 **HPC Day at UMass Dartmouth**, *UMass Dartmouth, MA*.
2017 **WINRS, New England: A Meeting of Mathematical Minds & Women's Intellectual Network Research Symposium** , *Brown University*.
2017 **SIAM Conference on Computational Science and Engineering** , *Atlanta, Georgia*.
2017 **60th Birthday Conference in honor of Chi-Wang Shu: Frontiers in Applied and Computational Mathematics**, *Brown University*.
2016 **HPC Day at UMass Dartmouth**, *UMass Dartmouth, MA*.
2016 **SIAM Conference on Mathematical Aspects of Materials Science**, *Philadelphia, Pennsylvania*.
2016 **22nd Annual Sigma Xi UMass Dartmouth Research Exhibit**, *UMass Dartmouth, MA*.
2015 **Mathematics in Data Science**, *ICERM at Brown University*.
2015 **SIAM Conference on Computational Science and Engineering** , *Salt Lake City, Utah*.
2014 **UMass System Scientific Computing Day**, *Center for Scientific Computing and Visualization Research*, UMass Dartmouth, MA.

Professional service and Community activities

Technical referee

Inverse Problems

Journal of Scientific Computing

Advances in Computational Mathematics

Journal of Computational Physics

International Journal of Modeling and Simulation

Bulletin of the Iranian Mathematical Society (BIMS)

East Asian Journal on Applied Mathematics

Minisymposia organization

2020 SIAM Conference on Uncertainty Quantification. Recent Advances in Data-driven Modeling for Uncertainty Quantification, co-organized with Lin Guo (Shanghai Normal University) and Jing Li (Pacific Northwest National Laboratory)

2019 ICIAM: The 9th International Congress on Industrial and Applied Mathematics, Valencia, Spain. Computationally Efficient Methods for Large-scale Inverse Problems in Imaging Applications, co-organized with Julianne Chung (Virginia Tech)

2019 SIAM Conference on Computational Science and Engineering, Spokane, WA. Recent Advances in Model Reduction and Uncertainty Quantification, co-organized with Kookjin Lee (Sandia National Lab)

Invited panel

2018 Panelist at WPI REU in Industrial Mathematics and Statistics Panel on Academic Careers in Mathematics

2017 Panelist at HPC Day at UMass Dartmouth

Community

2018 High School Outreach Event, Math Department, Virginia Tech

2018 Wikipedia Fellow

2015-2018 UMD SIAM Student Chapter President

2014-2015 UMD SIAM Student Chapter Vice President

Membership

2013 - Society for Industrial and Applied Mathematics (SIAM)

2013 - Association for Women in Mathematics (AWM)

2016 - American Mathematical Society (AMS)

Teaching and Mentoring

At Virginia Tech

Fall 2018 - **Supervising undergraduate student**.
- Jamie Kim, Department of Mathematics, Virginia Tech

At University of Massachusetts Dartmouth

Fall 2017 **PI Instructor: MATH 150 Precalculus**.
- Responsible for all of the lectures for the course
- Developed all of the course materials and online homework via MyMathLab

Spring 2015 **Math & Business Tutor**.
- Tutor advanced level math courses: *Calculus III, Partial Differential Equations, Optimization and Numerical Analysis*

Skills and Abilities

- Excellence in programming languages including Matlab and C/C++.
- Experience with R, HTML, Github and Linux environment.
- Considerable knowledge in Parallel Computing by MPI and Cuda.
- A strong background in computational and applied mathematics, scientific computing, numerical linear algebra, differential equations, mathematical modeling and simulation, optimization and control, and statistics.
- An excellent team worker and quick learner who is adaptable, open-minded and fluent in Mandarin and English.