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Brief excerpt: Updated 2025

- **Ph.D, 1988**, Mathematics, Carnegie Mellon University
- Current Position: **Fu Foundation Professor of Applied Mathematics** (2014-), Chair of Applied Mathematics Program (2015-2020); co-Chair of Center of Computing Systems for Data-driven Science (2019-), co-Chair of Center of Foundation of Data Science (2018-2019), Data Science Institute, Columbia University.
- Other Positions: **Verne M. Willaman Professor of Mathematics**, Penn State University (2006-2015); Tsunoda Senior Fellow, Waseda University (2023); Columbia-Paris Alliance Professor (2022).
- **Frontiers of Science Award**, ICBS (2024). **US Association Computational Mechanics Thomas J.R. Hughes Medal** (2021). **SIAM Review SIGEST paper award** (2020). **SIAM outstanding paper prize** (2016). **ACM Gordon-Bell prize finalist** (2016). **Feng Kang Prize in Scientific Computing** (2005). **SIAM Fellow**. **AAAS Fellow**. **AMS Fellow**.
- Founding Co-Editor-in-Chief, **Communications of the American Mathematics Society** (2020-); Editor-in-Chief, **SIAM Journal on Applied Mathematics** (2021-); Associate Editors of **SIAM J. Numer. Anal.** (2003-2012, 2014-2023), **SIAM J. Appl Math** (2012-2020) **Math of Computation** (AMS, 2016-2024); Member of editorial boards of 12 other journals such as **M3AS**, **DCDS-B**, **CMS**, **JCM**, **CiCP**, **NMTMA**, **IFB**, **CMAC**, **JMS**, **JPNM**, **CTAM**, etc. Series Editor of **Handbook of Numerical Analysis** (2015-).
- Chair of **AMS Fellow Selection Committee** (2022). Chair, **SIAM** activity group on mathematical aspects of materials science (2014-2016). SIAM Representative to the **U.S. National Committee on Theoretical & Applied. Mechanics** (USNC/TAM, 2015-2019), Council Member, **American Mathematical Society** (2023-2025). Member of **Prize Selection Committees** for various **SIAM**, **ICIAM** and **USACM** major prizes (2014-). Member of Scientific Program Committee, **ICIAM** (2019) , **SciCADE** (2024-). Conference Co-chair, **WCCM** (2018), **SIAM** Conference on Mathematical Aspects of Materials Science (2016).
- Research areas: applied and computational mathematics; numerical algorithms and scientific computation, selected applications in physical, biological, materials sciences, information sciences, and machine learning.
- Over 340 refereed publications: 300+ in professional journals, 40+ in proceedings/book-chapters, 1 book.
- Over 26500 Google Scholar citations with an H-index of 85 and 15000 SCI citations with an H-index of 65.
- Published in many disciplinary fields such as computational and applied mathematics, modeling and analysis, atmospheric, computer, imaging, and materials sciences, atomic, biological, and condensed matter physics, data science and machine learning, biomedical and mechanical engineering, etc.
- 30 former Ph.D. students graduated (including US **NSF** Career Award grantees, **AWM** dissertation prize awardee, **Sloan Fellowship** awardee, **SIAM Fellow**). Supervised 21 post-doc scholars, and 9 M.S. students
- Over 500 invited lectures given at conferences and academic institutions; Tutorials at IMA, IMS, BCAM, etc. **NSF-CBMS** distinguished speaker (10 lectures, 2017), Invited speaker at the **International Congress of Mathematicians** (ICM, 2018). SIAM Invited Address at the Joint Mathematics Meetings (**JMM** 2022). Invited speaker at **International Congress of Industrial and Applied Mathematicians** (ICIAM, 2027)

A. Education:

1986 - 1988 **Ph.D.**, Mathematics, Carnegie Mellon University, Pittsburgh, PA
 1984 - 1986 **M.S.**, Applied Mathematics, Carnegie Mellon University, Pittsburgh, PA
 1980 - 1983 **B.S.**, Mathematics, Univ. of Sci. and Tech. of China, Hefei, China

B. Research Interests: Applied and Computational Mathematics

Applied and numerical analysis, scientific computation

numerical analysis, applied analysis and PDEs, multiscale models, adaptive algorithms

Selected applications in physical, biological and materials sciences

superfluids, vortices, complex fluids, membranes, phase transformations, rare events

Selected applications in information sciences

data mining, model reduction, meshing, tessellations and image analysis, machine learning

C. Professional Experience:

2014 - present **Fu Foundation Professor of Applied Mathematics**,
 Fu Foundation School of Engineering and Applied Science, Columbia University.
 2014 - present **Affiliated Faculty**, and co-Chair of Center of AI for Science and Engineering (2025-),
 co-Chair of Center of Computing Systems for Data-driven Science (2019-2024),
 co-Chair of Center of Foundation of Data Science (2018 -2019), Data Science Institute,
 Columbia University
 2015 - 2020 Chair of Applied Mathematics Program, Columbia University.
 2006 - 2015 **Verne M. Willaman Professor of Mathematics**, Penn State University
 2005 - 2015 **Professor**, Dept. of Materials Sciences, Penn State University
 2001 - 2006 **Professor**, Dept. of Math., Penn State University
 1996 - 2002 **Senior Lecturer and Full Prof.**, Dept. of Math., HK Univ. of Sci. & Tech.
 1997 & 1999 **Associate and Full Prof.**, Dept. of Math., Iowa State University
 1994 - 1995 **Associate Professor with tenure**, Dept. of Math., Michigan State University
 1990 - 1994 **Assistant Professor**, Dept. of Math., Michigan State University
 1988 - 1990 **L. E. Dickson Instructor**, Dept. of Math., University of Chicago
 1984 - 1988 Teaching and Research Assistant, Carnegie Mellon University
 1984 Summer Faculty of Mathematics, University of Science and Technology, China

D. Recent Visiting and Adjunct Positions

2026 Visiting Researcher, Sydney Mathematical Research Institute.
 2023 Tsunoda Senior Fellow, Waseda University, Tokyo, Japan.
 2022 Columbia-Paris Alliance Visiting Professor, Ecole Polytechnique, Paris.
 2020-2023 Inaugural Feng Kang Visiting Scholar, AMSS, Chinese Academy of Sciences.
 2015-2017 Adjunct Professor, Department of Mathematics, Penn State University

E. Professional Societies, Honors and Awards:

• Current Professional Organization Membership:

Society of Industrial and Applied Mathematics (SIAM),
 American Mathematical Society (AMS),
 American Association of Advancement in Science (AAAS),
 United States Association of Computational Mechanics (USACM).

- **Services in Professional Societies:**

- 2023-2025 **USACM Thomas Hughes Medal Selection Committee.**
- 2023-2025 **AMS Council.**
- 2023-2024 **SIAM Task Force on the Future of Computational Science.**
- 2022-2025 **SIAM Ralph E. Kleinman Prize Selection Committee.**
- 2021-2024 **SIAM Committee on Science Policy.**
- 2021-2023 **ICIAM Maxwell Prize Subcommittee.**
- 2021 **Chair, AMS Fellows Selection Committee.**
- 2021-2024 **SIAM Committee on Mathematical Modeling and Computation Book Series.**
- 2020-2023 **AMS Fellows Selection Committee.**
- 2020 **Nomination Committee** for Officers of SIAG-MS (SIAM Activity Group on Mathematics for Materials Science).
- 2020 **Nomination Committee** for Officers of SIAG-APDE (SIAM Activity Group on Applied Partial Differential Equations).
- 2020- 2022 **EMI Committee on Machine Learning in Mechanics.**
- 2019-2021 **SIAM Prize Selection Committee for the John von Neumann Lecture.**
- 2019- **SIAM Journal Review Committee for Multiscale Modeling and Simulations.**
- 2018-2020 **SIAM Fellows Canvassing Committee.**
- 2018-2019 **SIAM News Editorial Board**, Liaison for Activity Group in Materials Science (SIAG-MS).
- 2016 **Nomination Committee** for Officers of SIAG-MS (SIAM Activity Group on Mathematical Aspects of Materials Science).
- 2015-2019 **Member and SIAM Representative to USNC-TAM** (US National Committee on Theoretical and Applied Mechanics), the National Academies.
- 2014-2016 **Chair of SIAG-MS** (SIAM Activity Group on Mathematical Aspects of Materials Science), elected.
- 2014-2018 **Member of the 9th Council**, Chinese Computational Mathematics Society (CMS).
- 2014-2015 **Chair of SIAM Peter Henrici Prize Selection Committee.**
- 1998-2002 **Standing Committee member**, the 5th Council of Chinese CMS.

- **External honors/awards received:**

- 2024 Winner of the **Frontiers of Science Award**, International Congress of Basic Sciences.
- 2023 Winner of the **Smart Cities North America Awards**, awarded by the IDC Government insight, for the *Digital Twin of New York City* project led by the NSF project team at Columbia University;
- 2021 **US Association of Computational Mechanics Thomas J.R. Hughes Medal**, USACM, for numerous innovative contributions to computational physics and computational fluid mechanics, and unwavering service to the scientific computing community;
- 2020 **SIAM Review SIGEST paper award**, for a paper published in *SIAM Journal on Numerical Analysis* in 2014, coauthored with former Ph.D student Xiaochuan Tian.
- 2019 **Feng-Kang Visiting Scholar**, Institute of Computational Mathematics and Scientific and Engineering Computing, Chinese Academy of Sciences;
- 2017 **Inaugural excellent paper prize**, for a 2015 paper published in *SCIENTIA SINICA Mathematica*;
- 2016 **SIAM outstanding paper prize**, for a paper published in *SIAM Journal on Numerical Analysis*, co-authored with former Ph.D student Xiaochuan Tian in 2013;
- 2008 **Outstanding research team award** for 973 project *Large Scale Scientific Computation Research* (as the team's Chief Scientist), China Ministry of Science and Technology;
- 2005 Recipient of the **Feng Kang Prize in Scientific Computing.**

- **Awards received from institutions:**

- 2007 Recipient of the **Eberly College of Science Medal**, Penn State University;

- 2000 Co-recipient of the **Liberal Arts and Sciences Award for outreach/extension**, ISU;
- 1992 Recipient of **Frame Faculty Teaching Award**, Michigan State University;
- 1988 Recipient of 1987 **J. D. Liang** Fellowship, Carnegie Mellon University.

- **Other External Recognitions:**

- 2027 **Invited Speaker, Intern. Congress of Industrial & Applied Mathematicians (ICIAM2027)**.
- 2022 **SIAM Invited Address at the Joint Mathematics Meetings**, 2022.
- 2022 Top 200 best mathematicians worldwide ranked by Research.com.
- 2018 **International Congress of Mathematicians Invited Speaker**, ICM2018.
- 2016 **ACM Gordon-Bell prize finalist**; for largest and fastest 3D phase field microstructure coarsening simulations (co-authored with former postdoc Dr.Jian Zhang, lead author, and other team members).
- 2019 **AMS Fellow**, Class of 2020,
for contributions to applied and computational mathematics with applications in materials science, computational geometry, and biology.
- 2017 **AAAS Fellow**, Class of 2017,
for distinguished contributions to the field of applied and computational mathematics mathematics, particularly for theoretical analysis and numerical simulations of mathematical models in various applications.
- 2013 **SIAM Fellow**, Class of 2013,
for contributions to applied and computational mathematics with applications in materials science, computational geometry, and biology.

F. Selected Services:

- **Chief Editors:**

- Founding Co-Editor-in-Chief (2020–), **Communications of the American Mathematical Society**,
published by the American Mathematical Society.
- Editor-in-Chief (2021–, Section Editor 2015–, Associated Editor 2012–),
SIAM Journal on Applied Math.,
published by SIAM.

- **Editorial boards:**

- Associate Editor (2003–2012, 2014–2023), **SIAM Journal on Numerical Analysis**,
published by SIAM.
- Associate Editor (2016–2024), **Mathematics of Computation**,
published by American Mathematical Society.
- Editorial Advisory Board (2025–), **International Journal for Numerical Methods in Engineering**,
published by Wiley.
- Associate Editor (2000–2005, 2018–), **Journal of Computational Mathematics**,
published by CAS and VSP.
- Associate editor (2018–), **Mathematical Models and Methods in Applied Sciences**,
published by World Scientific.
- Member of editorial board (2006–), **Discrete and Continuous Dynamical Systems - B**,
published by the American Institute of Mathematical Sciences.
- Member of editorial board (2009–), **Journal of Mathematical Research and Applications**,
published by the DLUT.
- Associate editor (2017–), **Interfaces and Free Boundaries**,
published by the European Mathematics Society.

- Member of the editorial board (2019–), **Calcolo**,
published by Springer.
- Member of the editorial board (2012–), **Communications in Mathematics and Statistics**,
published by Springer and USTC.
- Member of the editorial board (2013–), **Journal of Mathematical Study**,
published by Global Science Press and Xiamen University.
- Member of editorial board (2014–), **Communications in Mathematical Sciences**,
published by the International Science Press.
- Associate editor (2018–), **Journal of Peridynamics and Nonlocal Modeling**,
published by Springer;
- Member of editorial board (2018–), **Communication on Applied Mathematics and Computation**,
published by Springer;
- Associate editor (2019–), **CSIAM Transaction on Applied Mathematics**,
published by the Global Science Press.
- Editor of book series (2015–), **Handbook of Numerical Analysis**,
published by Elsevier.
- Editor of book series (2021–2025), **SIAM Mathematical Modeling and Computation Book Series**,
published by SIAM.
- Section Editor (2015-2020), **SIAM Journal on Applied Mathematics**,
published by SIAM.
- Member of editorial board (2016-2022), **Journal of Scientific Computing**,
published by Springer.
- Associate Editor (2012–2015), **SIAM Journal on Applied Mathematics**,
published by SIAM.
- Associate editor (2010–2020), **Communications in Computational Physics**,
published by the Global Science Press.
- Associate editor (2009–2020), **Numerical Mathematics: Theory, Methods and Applications**,
published by the Springer and Global Science Press.
- Editor (2002-2016), **Applied Mathematics Research eXpress**,
published by the Oxford University Press.
- Member of editorial board (2002-2007), **Chinese Journal of Computational Physics**,
published by Global Science Press.
- Member of editorial board (2004–2007), **Journal of Information and Computational Science**,
published by Binary Information Press, USA.
- Member of editorial board (2001-2005), **Communications in Pure and Applied Analysis**,
published by the American Institute of Mathematical Sciences.

• **External Committee/Services:**

- 2025, 2022-2023, **Reviewer**, New Cornerstone prize.
- 2025-2026 **Panelist**, Research Assessment Exercise (RAE2026), University Grant Council, Hong Kong.
- 2025-2027, **Panelist**, Physical Science Panel, Research Grant Council, Hong Kong.
- 2025-2027, **Panelist**, Physical Science Panel, Research Fellow Scheme, Research Grant Council, Hong Kong.
- 2025, **Member**, **Frontier of Science Award Nomination Subcommittee** (Numerical Analysis),
International Congress of Basic Sciences.
- 2023, **Member**, **Visiting Committee for the Science Faculty**, Chinese University of Hong Kong.
- 2020-2022, **Reviewer**, Xplorer prize.
- 2017-2020, **Oversea Assessment Expert**, Chinese Academy of Sciences.

- 2017-2019, **Member, Physical and Computational Sciences Directorate Advisory Committee**, Pacific Northwest National Laboratory (PNNL).
- 2017, **Member of Visiting Committee for Academic Review**, The Chinese University of Hong Kong.
- 2015-2019, **Member of the Scientific Advisory Committee**, Institute for Computational and Experimental Research in Mathematics (ICERM, NSF-funded), Brown University;
- Panelist for U.S. National Science Foundation (1997, 2003, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2013, 2014, 2015, 2016, 2020), including NSF Graduate Fellowship and NSF Career Award programs;
- 2014, Member of NSF Mathematics Institute site visit team;
- 2011-2013, Panelist for DOE grants;
- 2009, Panelist for CBMS-NSF grants;
- 2009, Panelist for Portugal Foundation of Science and Technology;

• **Conference/workshop organization:**

- Minisymposia organization in national and international meetings:
Co-organizer (together with J. Chapman, Oxford Univ.) of the minisymposium on the superconductivity at the SIAM meeting on mathematics in material sciences, (1994); Organizer of the minisymposium on the mathematical modeling of superconductivity at the Fourth International Conference on Industrial and Applied Mathematics, (1999); Co-organizer of the minisymposium on the superconductivity at the SIAM meeting on mathematics in material sciences (2002); Co-organizer of the minisymposium on the mathematical modeling of superconductivity at the SIAM meeting on mathematics in material sciences (2004); Co-organizer of the minisymposium on the centroidal Voronoi diagrams at the SIAM annual meeting (2005); Organizer of the the minisymposium on the modeling and simulation of biological membranes at the joint SIAM-SMB Conference of Life Sciences (2006); Co-organizer, minisymposium on high-order methods for interface problems, ICOSAHOM, Beijing (2007); Co-organizer, minisymposium on dynamics of membranes (with A. Voigt), ICIAM, Zurich (2007). Co-organizer (with Tim Healey of Cornell), minisymposium on Modeling and Analysis of Multi-Phase Lipid Bilayer Membranes, 7th AIMS International Conference on Dyn. Systems, Diff. Equations, Arlington (2007); Co-organizer, minisymposium on Mechanics and Biophysics of Lipid Bilayer Membranes, SIAM conference on life sciences, Pittsburgh (2010). Co-organizer, minisymposium on Nucleation and Rare Events: from Theory to Simulations, ICIAM, Vancouver (2011); Co-organizer, special session on the Mathematical and Numerical Analysis of Nonlocal Problems, Joint Mathematics Meeting, San Diego (2013); Co-organizer, minisymposia on Mathematical and Computational Aspects of Peridynamics and Related Nonlocal Models, SIAM Conference on Mathematical Aspects of Materials Science (2013); Co-chair, session on Nonlocal Mechanics and Peridynamics, USACM Thematic Conference on Isogeometric Analysis and Meshfree Methods, San Deigo (2016); Minisymposium on Non-local Models in Computational Science and Engineering, SIAM conference on computational science and engineering, Atlanta (2017); Thematic session on numerical PDEs, 13th AIMS international conference (2024);
- International conference and workshop organization:
Organizer, Workshop on numerical PDEs, held at HKUST, sponsored by the Hong Kong Mathematics Society, HKUST and HKBU (1998); Co-organizer, Workshop on computational biology, Shanghai Normal University, co-sponsored by Shanghai Normal University (2000); Co-organizer, workshop on computational physics and computational material sciences, QinHuang Island, China, (2001); Co-organizer, international workshop on mutiscale modeling and simulations in materials and biology, Fudan University, China, (2004); Chair of the program committee, International conference on scientific computing in petroleum industry, Beijing (2004); Co-organizer (with Fanghua Lin of Courant Inst) of the Workshop on Ginzburg-Landau theory and related topics (2005); Co-organizer of the International Conference on recent advances in scientific computation, Beijing (2006); Co-Chair, organizing committee for the summer program on Mathematical Theory and Numerical Methods for Computational Materials Simulation and Design Chair of the organizing committee, International workshop on computational and applied mathematics, Yellow Mountain,

- China (2013); Co-organizer, International Workshop on quantum, kinetic, and nonlocal problems and related topics, Beijing, China (2014); Co-Chair: Workshop on advances in scientific computing and applied mathematics, Las Vegas, NV (2015); Co-organizer: Workshop on Quantification of Uncertainties in Material Science, NIST, Gaithersburg, MD (2016); Co-organizer: Workshop on multiscale modeling and its applications: from weather and climate models to models of materials defects, Toronto (2016); Co-organizer: Columbia DSI/TRIPODS Deep Learning Workshop (2019); Co-organizer: International Workshop on Recent Progress in Nonlocal Modeling, Analysis, and Computation, SUSTECH (online 2020); Co-organizer: One Nonlocal World opening workshop (online 2021); Co-organizer: Workshop on Mathematical and Computational Materials Science, Institute for Mathematical and Statistical Innovation (IMSI, online 2021); Co-organizer: Workshop on Nonlocality: Analysis, Numerics and Applications, Lorentz Center, Leiden, Netherlands (2022); Co-organizer: AIM-SQuaRE on variational methods for multiscale and nonlinear nonlocal models with applications to peridynamics (2023-2025); Co-organizer: Thematic session on Numerical Analysis and Scientific Computing, 13th AIMS International Conference (2024); Co-organizer: Modeling and Control of Vehicular Traffic and Transportation Systems, IMSI (2027)
- Conference co-chair, SIAM MS16, SIAM Conference on Mathematical Aspects of Materials Science (2016); Conference co-chair, WCCM 2018 (World Congress of Computational Mechanics, 2018); Member of Scientific Program Committee, ICIAM 2019 (International Congress of Industrial and Applied Mathematics, 2019);
 - Member of Organizing Committees:
The 7th workshop on scientific computing workshop in Hong Kong, held at Hong Kong Baptist University (1999); the 2nd China-Sweden workshop on numerical PDEs, held at HKUST, (2000); International conference on scientific and engineering computation, Beijing, China, (2001). Satellite conference for the International congress of mathematicians on scientific computing, (2002); International Conference on recent advances in scientific computation, Beijing, China (2006); Conference on Advances in Scientific Computation, University of Chicago (2007); International Workshop on Scientific Computing, Inst. Computational Mathematics, Beijing (2008); SIAM Conference on Mathematical Aspects of Materials Science (2013); Workshop on Multiscale Modeling and Simulation of Defect Problems in Materials Science, Institute of Advanced Studies and Hong Kong University of Science and Technology, Hong Kong (2014); Fields Institute Annual Program on Multiscale Scientific Computing, Toronto (2016); USACM Thematic Conference on Isogeometric Analysis and Meshfree Methods, San Diego (2016); USNCTAM National Congress (jointly with the Chinese Society of Theoretical and Applied Mechanics) (2018); International Conference on Mathematical Modeling and Numerical Methods, QingDao (2019); International Congress of Industrial and Applied Mathematics (2019); New York Summit of Data Science (NYSDS, 2020); One nonlocal world opening workshop (2021); IMSI Mathematical and Computational Materials Science Workshop (2021); Workshop on Nonlocality in Analysis, Numerics and Applications, Lorentz Center, Austria (2021); Workshop on Mean-Field Models for interacting agents, Part of the long program on Distributed Solutions to Complex Societal Problems, IMSI (2021); New York Summit of Data Science (2021); One nonlocal world nonlocal codes workshop (2021); SIAM Conference on Mathematics of Data Science (MDS22). Member of the Scientific Committee of the International Conference on Scientific Computing and Differential Equations (SciCADE, 2023-2026);

- **Consulting services:**

Consultant (2007, Sept-Dec), X-ray data assimilation for **Nova Micro Inc**, State College, PA

G. Teaching:

- **Teaching Experience:**

Courses: Over the last 30 years, I have taught a broad spectrum of undergraduate and graduate courses to students with diverse mathematical background. The courses include graduate courses on Numerical Analysis, Numerical Solutions of Differential Equations, Finite Element Methods, Finite Difference Methods, Stochastic Modeling and Simulations, Methods in Computational Science (High Performance Computing),

Advanced Topics in Numerical Analysis and Applied Mathematics. They also include undergraduate sequences in Calculus, Linear Algebra, Optimization, Operations Research, Introduction to Mathematical Proof, Differential Equations, Numerical Analysis, Boundary Value Problems, Analysis, Numerical Differential Equations, some of which were taught in a large lecture format with students ranging from 100 to 180. I have also served as a course coordinator for courses with multiple sections.

H. Publications:

Book

- *Nonlocal Modeling, Analysis and Computation*, **CBMS-NSF Regional Research Conference Series**, Vol 94, SIAM, 2019.

Selected Refereed Journal Publications (Full list can be found at www.columbia.edu/~qd2125)

- *Asymptotically compatible schemes for nonlinear variational models via Gamma-convergence and applications to nonlocal problems* with J. Scott and X.C. Tian, **Mathematics of Computation**, 2025.
- *Nonlocal boundary-value problems with local boundary conditions II, Green's identities and regularity of solutions*, with J. Scott, **SIAM J. Math. Anal.**, 57, 404-451, 2025.
- *Nonlocal boundary-value problems with local boundary conditions I, function spaces and variational principles*, with J. Scott, **SIAM J. Mathematical Analysis**, 56, 4185-4222 2024.
- *Revealing excited states of rotational Bose-Einstein condensates*, with J. Yin, Z. Huang, Y. Cai and L. Zhang, **The Innovation**, 5, 100546, 2024.
- *Minimizing optimal transport for functions with fixed-size nodal sets*, with A. Sagiv, **J. Nonlinear Sci.**, 33, 95, 2023.
- *Bifurcation and fission in the liquid drop model: a phase-field approach*, with Z. Xu, **J. Math. Phys.**, 64, 071508, 2023.
- *Nonlocal trace spaces and extension results for nonlocal calculus*, with X. Tian, C. Wright and Y. Yu, **J. Functional Analysis**, 282, 109453, 2022.
- *Automated discovery of fundamental variables hidden in experimental data*, with B. Chen, K. Huang, S. Raghupathi, I. Chandratreya and H. Lipson, **Nature Computational Sci.**, 2, 433-442, 2022.
- *Stability of a nonlocal traffic flow model for connected vehicles*, with K. Huang, **SIAM J. Appl. Math.**, 82, 221-243, 2022.
- *Maximum bound principles for a class of semilinear parabolic equations and exponential time differencing schemes*, with L. Ju, X. Li and Z. Qiao, **SIAM Review**, 63, 317-359, 2021.
- *Discovery of dynamics using linear multistep methods*, with R. Keller, **SIAM J. Numer. Anal.**, 59, 429-455, 2021.
- *Numerical methods for nonlocal and fractional models*, with M. D'Elia, C. Glusa, M. Gunzburger, X. Tian and Z. Zhou, **Acta Numerica**, 29, 1-124, 2020.
- *Mathematics of Smoothed Particle Hydrodynamics via a study of nonlocal Stokes equations*, with X. Tian, **Foundation of Computational Mathematics**, 20, 801-826, 2020.
- *Asymptotically compatible schemes for robust discretization of parametrized problems with applications to nonlocal models*, with X. Tian, **SIAM Review**, 62 (1), 199-227, 2020. (SIAM Review SIGEST Award).
- *Asymptotically compatible SPH-like particle discretizations of one dimensional linear advection models*, with H. Lee, **SIAM J. Numerical Analysis**, 57, 127-147, 2019.
- *New error bounds for deep ReLU networks using sparse grids*, with H. Montanelli, **SIAM Journal on Mathematics of Data Science**, 1, 78-92, 2019.
- *An invitation to nonlocal modeling, analysis and computation*, **Proceedings of the International Congress of Mathematicians (ICM 2018)**, 3, 3523-3552, 2018.
- *Stability of nonlocal Dirichlet integrals and implications for peridynamic correspondence material modeling*, with X. Tian, **SIAM J. Appl. Math.**, 78, 1536-1552, 2018.

- *Nonlocal neural networks, nonlocal diffusion and nonlocal modeling*, with Y. Tao, Q. Sun, and W. Liu, In **Advances in Neural Information Processing Systems (NIPS2018)**, 494-504, 2018.
- *Trace theorems for some nonlocal energy spaces with heterogeneous localization*, with X. Tian, **SIAM J. Math. Anal.**, 49, 1621-1644, 2017.
- *Recent developments in computational modeling of nucleation in phase transformations*, with L. Zhang, W.-Q. Ren and A. Samanta, **npj Computational Materials**, 2, 16003, 2016.
- *On the variational limit of some nonlocal convex functionals of vector fields*, with T. Mengesha, **Nonlinearity**, 28, 3999-4035, 2015.
- *Asymptotically compatible schemes and applications to robust discretization of nonlocal models*, with X. Tian, **SIAM J. Numer. Anal.**, 52, 1641-1665, 2014.
- *A nonlocal vector calculus, nonlocal volume-constrained problems, and nonlocal balance laws*, with M. Gunzburger, R. Lehoucq and K. Zhou, **Math. Mod. Meth. Appl. Sci.**, 23, 493-540, 2013.
- *Analysis and comparison of different approximations to nonlocal diffusion and linear peridynamic equations*, with X. Tian, **SIAM J. Numer. Anal.**, 51, 3458-3482, 2013 (SIAM Outstanding Paper Prize).
- *Analysis and approximation of nonlocal diffusion problems with volume constraints*, with M. Gunzburger, R. Lehoucq and K. Zhou, **SIAM Review**, 54, 667-696, 2012.
- *Robust Modeling of Constant Mean Curvature Surfaces*, with P. Hao, Y.-K. Choi, Y. Liu, W. Hu, K. Polthier, C. Zhang, W. Wang, **ACM Trans. Graphics (SIGGRAPH12)**, 31, Article 85, 2012.
- *Shrinking Dimer Dynamics and its Applications to Saddle Point Search*, with J.Y. Zhang, **SIAM J. Numer. Anal.**, 50, 1899-1921, 2012.
- *Analysis of a stochastic implicit interface model for an immersed elastic surface in a fluctuating fluid*, with M. Li, **Archive for Rational Mech. Anal.**, 199, 329-352, 2011.
- *Vortex solutions of the high- κ high-field Ginzburg-Landau model with an applied current*, with J. Wei and C. Zhao, **SIAM J. Math. Anal.**, 42, 2368-2401, 2010.
- *Numerical approximations of a norm preserving gradient flow and applications to an optimal partition problem*, with F.-H. Lin, **Nonlinearity**, 22, 67-83, 2009.
- *Modelling and simulations of multi-component lipid membranes and open membranes via diffuse interface approaches*, with X. Wang, **J. Mathematical Biology**, 56, 347-371, 2008
- *Adhesion of vesicles on patterned substrates*, with S. Das, **Phy. Rev. E**, 77.011907 (1-7), 2008 (selected for the Jan 15, 2008 issue of Virtual J. Biological Phys. Res. by APS).
- *Diffuse-interface description of strain-dominated morphology of critical nuclei in phase transformations*, with L. Zhang and L.Q. Chen, **Acta Materialia**, 56, 3568-3576, 2008.
- *Morphology of critical nuclei in solid state phase transformations*, with L. Zhang and L. Chen, **Physical Review Letters**, 98, No.25, 265703, 2007.
- *From micro to macro dynamics via a new closure approximation to the FENE model of polymeric fluids*, with C. Liu and P. Yu, **Multiscale Modeling and Simulations**, 3, 895-917, 2005.
- *Computing the ground state of the Bose-Einstein condensate via normalized gradient flow*, with W. Bao, **SIAM J. Scientific Comp.**, 25, 1674-1697, 2004.
- *A phase field approach in the numerical study of the elastic bending energy for vesicle membranes*, with C. Liu and X. Wang, **J. Computational Physics**, 198, 450-468, 2004.
- *Dissipative flow and vortex shedding in the Painlevé boundary layer of a Bose Einstein condensate*, with A. Aftalion and Y. Pomeau, **Physical Review Letters**, 91, 090407, 2003.
- *Tetrahedral mesh generation and optimization based on centroidal Voronoi tessellations*, with D. Wang, **Int. J. Numer. Meth. Eng.**, 56, 1355-1373, 2003.
- *Vortices in the Bose-Einstein condensate: the critical velocities and energy diagrams in the Thomas-Fermi regime*, with A. Aftalion, **Physical Review A**, 64, 063603(1-11), 2001.
- *Centroidal Voronoi tessellations: Applications and algorithms*, with V. Faber and M. Gunzburger, **SIAM Review**, 41, 637-676, 1999.
- *Ginzburg-Landau vortices: dynamics, pinning and hysteresis*, with F.H. Lin, **SIAM J. Math. Anal.**, 28, 1265-1293, 1997.

- *High-kappa limit of the time dependent Ginzburg-Landau model for superconductivity*, with P. Gray, **SIAM J. Appl. Math.**, 56, 1060-1093, 1996.
- *Spectral viscosity methods for multidimensional hyperbolic conservation laws*, with G. Chen and E. Tadmor, **Mathematics of Computation**, 61, 619-643, 1993.
- *Analysis and approximation of the Ginzburg-Landau model of superconductivity*, with M. Gunzburger and J. Peterson, **SIAM Review**, 34, 54-81, 1992.
- *Numerical studies of a continuum model of Phase Transition*, with R. A. Nicolaides, **SIAM J. Numer. Anal.**, Vol.28, No.5, 1310-1322, 1991;
- *A finite difference domain decomposition algorithm for numerical solution of the heat equation*, with C. Dawson, & T. Dupont, **Mathematics of Computation**, 57, 63-71, 1991;

Selected Refereed Conference Proceedings:

- *Stabilizing traffic via autonomous vehicles: a continuum mean field game approach*, with K. Huang, X. Di, X. Chen, IEEE 22nd Intelligent Transportation Systems Conference (**ITSC**), 3269-3274, 2019.
- *An invitation to nonlocal modeling, analysis and computation*, **ICM2018**, Proceedings of International Congress of Mathematicians, Vol. 3, 3523–3552, Rio de Janeiro, Brazil, 2018.
- *Nonlocal neural networks, nonlocal diffusion and nonlocal modeling*, with Y. Tao, Q. Sun, W. Liu, *Advances in Neural Information Processing Systems* 31 (**NIPS2018**), 494-504, 2018.
- *Extreme-scale phase field simulations of coarsening dynamics on the sunway taihulight supercomputer*, with J. Zhang, C. Zhou, Y. Wang, L. Ju, X. Chi, D. Xu, D. Chen, Y. Liu, Z. Liu, Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, **SC2016**, Article No.4, Salt Lake City, IEEE Press, 2016. (ACM Gordon Bell Prize Finalist).

I. Student Training and Supervising Experience:

• Ph.D Students and doctoral dissertations supervised:

Paul Gray	Superconductivity models, their numerical approximations and parallel simulations, (1996, MSU) First position: Visiting Assistant Prof., Emory University
Joan Remski	Models and algorithms for superconducting junctions.(1997, MSU) First position : Assistant Prof., University of Michigan, Dearborn
Lili Ju	Centroidal Voronoi Tessellations (2002, ISU) (jointly supervised with M. Gunzburger) First position : IMA post-doc., University of Minnesota
Xiaoqiang Wang	Phase field modeling of cell membranes (2005, PSU) First position : IMA industrial math Post-doc, University of Minnesota
Maria Emelianenko	Multilevel and adaptive algorithms for some nonlinear optimizations problem (2005, PSU) First position : CNA Post-doc, Carnegie Mellon University US NSF Career Award Grantee, Penn State Graduate Alumni Outstanding earlier achievement awardee
Liyong Zhu	Study on mixed finite element method for a phase field model of vesicle membrane (2007, CAS) First position : Research Scientist, Inst. Appl. Phys. Comp. Math., Beijing
Jiakou Wang	Stochastic and deterministic coagulation models, their numerical approximations and applications to cell aggregation (2007, PSU) First position : Quantitative Analyst, Lehman Brothers Inc.
Lei Zhang	Phase field model for nucleation in solid state phase transformations (2008, PSU)

	First position : Visiting Assistant Professor, Univ. of Cal., Irvine
Tianjiang Li	Abstract principal component analysis and applications to model reduction (2009, PSU) First position : Imaging Scientist, CGGVeritas, Houston
Manlin Li	Stochastic implicit interface models and their mathematical analysis (2010, PSU) First position :Software developer, Microsoft
Yanxiang Zhao	Phase field modeling on multicomponent vesicle adhesion and fusion (2011, PSU) First position : Post-doc, UCLA and UCSD
Yanping Ma	Population dynamics modeling of heterotypic cell aggregations and parameter identification problems (Co-supervisor: D. Cheng, Bioengineering, 2011, PSU) First position : Tenure-track assistant professor, Loyola Marymount University
Kun Zhou	The Peridynamic Theory of Solid Mechanics (2011, PSU) First position : Quantitative Analyst at UBS
Thinh Le	Nonlocal Exterior Calculus (2013, PSU) First position : Faculty at Vietnam National University
Jingyan Zhang	Shrinking dimer dynamics and its application in saddle point search (2013, PSU) First position : Quantitative Analyst at a hedge fund
Zhan Huang	Nonlocal models with convection effects (2015, PSU) First position : Quantitative Analyst at Bank of NY Mellon
Xiaochuan Tian	Nonlocal models with a finite range of interactions (2016, Columbia) First position : Postdoc at Columbia & Visitor at Hausdorff Institute of Mathematics, Bonn, Germany (Spring 2017), Bing Instructor at UT Austin (Fall 2017-). Winner of best Ph.D. dissertation award from the Association for Women in Mathematics.
Liming Yuan	Study of linear and nonlinear nonlocal models (2017 PSU) First position : Quantitative Associate at Wells Fargo Bank
Yunzhe Tao	Nonlocal Neumann volume-constrained problems and their application to local-nonlocal coupling (2019, Columbia) First position : Research Scientist at Amazon AWS
Qi Sun	Optimal control of stochastic systems: theory, numerics, and applications (2019, USTC, jointly supervised with M.P. Zhang) First Position: BoYa Postdoc Fellow, Peking Univ.
Hong Liang	Data-Driven compressive sensing method and applications in uncertainty quantification (2019, Tsinghua Univ., jointly supervised with W.A. Yong) First Position: Postdoc Fellow, Tsinghua Univ.
Rachael Keller	A mathematical study of learning dynamics (2020, Columbia) First position: Research Scientist at Dynetics.
Hwi Lee	Some applications of nonlocal models to smoothed particle hydrodynamics-like methods (2021 Columbia) First position: Visiting Assistant Professor at Georgia Tech.
Ruotai Li	Phase field study on the phase transition and nucleation in the ferroelectric thin films (2021 Peking University, jointly supervised with Lei Zhang) First position : Assistant Professor at Beijing Univ. of Posts and Telecommunications
Chao Tian	Mean-field models and nonlocal problems (2022, Penn State, jointly with Anna Mazzucato) First position : Data Scientist.
Xiaoxuan Yu	Numerical simulation and analysis on linear nonlocal conservation laws with variable horizon (2022, USTC, jointly with Yan Xu)

	First position : Algorithmic developer, Samsung Research, China.
Kuang Huang	Mathematical modeling of traffic flow for connected and automated vehicles (2022, Columbia) First position : Assistant Professor, Chinese University of Hong Kong
Zirui Xu	Ohta-Kawasaki energy and its phase-field simulation (2024, Columbia) First position : Quantitative analyst., Wall Street.
Ling Lan	Machine learning and statistical approaches to extend structure solution methods to lower symmetry cases (2025, Columbia, jointly with Simon Billinge) First position : Machine Learning Engineer, Pinterest.
Edith Zhang	Ginzburg-Landau functionals and reaction-diffusion equations in the large-graph limit (2025, Columbia) First position : Assistant Professor at UCLA.
Madison Ihrig	Optimal control of network spreading models in varied applications (2025. Columbia) First position : Scientist at the Department of the State.
Daozhe Lin	(current, Columbia)
Peter Jin	(current, Columbia)
Winston Yu	(current, Columbia)

• **M.S.** Students and master theses supervised:

Gregory Kibidze	Symmetric solvers for advection-dispersion problems (1997, ISU) 1st position : Senior Engineer., NEC, Japan
Tak-Wing Wong	Centroidal voronoi diagrams, theory and applications (1999, HKUST) 1st position : Demonstrator, Hong Kong
Tianyu Zhang	Numerical approximation of Stochastic PDEs (2000, HKUST) Current position : Faculty at Univ of Montana
Lei Zhang	Numerical Simulation of 2nd order SDEs (2001, CAS) 1st position : Ph. D Candidate at Penn State University
Anthony Faulds	Application of CVTs to model reduction (Math/AeroEng, 2003, PSU) 1st position : Software Engineer, RamLab
Bo Yu	Analysis of profiles in phase field models (Math/Stat, 2006, PSU) 1st position : Department of Health, Florida State Government
Yicheng Wen	Investigating new stopping rules for symbolic dynamic filtering (2010, PSU) 1st position : Ph. D Candidate in EE at Penn State University
Matthew Baran	Computational study of robustness in level set surface reconstruction (2012, PSU) 1st position : Research staff at ARL
Xiaochuan Tian	Theory of asymptotically compatible schemes and its application (2014, PSU) 1st position : Ph. D Candidate at Columbia University

• **Post-Doc** advisees:

Pingbing Ming	(1999)	Shijing Ding	(1999-2000)
Desheng Wang	(2000-2002)	Ping Zhang	(2001)
Zhaohui Huang	(2001-2003)	Wenxiang Zhu	(2002-2005)
Peng Yu	(2003-2005)	Jian Zhang	(2005-2009)
Sovan Das	(2006-2009)	Brandon Chabaud	(2009-2011)
Li Tian	(2009-2012)	Tadele Mengesha	(2011-2014)
Feng Sun	(2013-2014)	Jiang Yang	(2014-2017)
Zhi Zhou	(2015-2017)	Hadrien Montanelli	(2017-2018)
Ran Gu	(2017-2020)	Lorenzo Toniazzi	(2018-2019)

Johan Warnegard	(2023-2024)	Jacek Gruca	(2022-2024)
James Scott	(2021-2025)	Tianyi Zhou	(2025-present)
Baoming Shi	(2025-present)		

• **Ph.D** committees at Penn State:

William Trevor,	Atomic Physics	Venu Vaithyanathan,	Materials science
Jianxin Zhu,	Materials science	Long Chen,	Mathematic
Qina Zhou,	Electric Engineering	Shenyang Hu,	Materials science
Rolf Ryham,	Mathematics	Jia Pan,	Mathematics/Economics
Michael Sostarecz,	Mathematics	Yizhong Qu,	Mechanical Engineering
Jingzhi Zhu,	Material science	Jason Williams,	Atomic Physics
Michael Higley,	Mathematics	Weixin Yao,	Statistics
Jianxian Zhang,	Materials science	Andong He,	Mathematics
Tao Wang,	Mathematics	Weiming Feng,	Materials science
Lili Lei,	Meteorology	Taewook Heo,	Materials science
Sheng Guang,	Materials science	Ben Winchester,	Materials science
Kunok Chang,	Materials science	Guifang Fu,	Statistics
Oleksandr Misiats,	Mathematics	Jimbum Kim,	Computer science
Ying Zhang,	Statistics	Junhong Wei,	Meteorology
Yijia Gu,	Materials science	Fei Xue,	Materials science
Chao Liang,	Mathematics	Richard Otis,	Materials science
Junhong Wei	Meteorology	Yuqi Sun,	Industrial Engineering
Bo Wang,	Materials science		

• **Ph.D** committees at Columbia:

James Lee Thorp,	Applied Math	Michael Jenkinson,	Applied Math
Chenxi Guo,	Applied Math	Chris Stoafer,	Applied Phys
Wentao Xu,	Applied Math	Kun Wang,	Civil Engineering
Oded Stein,	Applied Math	Owen Evans,	Applied Math
Jiao Li,	Applied Math	Cagen Ozen	Applied Math
Bo Wang	Materials (PennState)	Chia-Hao Liu	Materials Science
Eric Bryant	Civil Engineering	Chunlin Wu	Civil Engineering
Wen Ding	Applied Math	Mo Zhaobing	Civil Engineering
Philip Dinenis	Applied Math	Huang Heqing	Applied Phys
Huaiyu Li	Applied Math	Wentao Xu	Applied Math
Chilin Zhang	Mathematics		

(also served on more than 40 additional Ph. D. Committees in other institutions).

J. Invited lectures:

• **Over 520 invited lectures given at conferences and academic institutions.**

Selected lectures in the last 10 years:

2026 International Congress of Chinese Mathematicians, Shanghai; William Benter Distinguished lecture, City U, Hong Kong; Courant Institute, New York University;

2025 Department of Mathematics, University of Hong Kong; Workshop on Advances in Numerical Analysis and Scientific Computing, HK Poly University; Department of Mathematics, National University of Singapore; Department of Mathematics, HK Poly University; Department of Mathematics, University of Macao; Department of Mathematics, Chinese University of Hong Kong at Shenzhen; Center for Computational Mathematics, Flatiron Institute; Department of Mathematics, University of California at Riverside; Plenary lecture, Workshop on Advanced Numerical Methods For Deterministic And Stochastic Differential

Equations, Vietnam Institute of Advanced Study in Mathematics, Hanoi; Workshop on Data and Scientific Computing, Southwest Cai-Jing University, Sichuan, China; DOE Conference on Advances in Scientific Computing and Applied Mathematics (ASCAM 2025), Breckenridge, Colorado; Workshop on Scientific Computing and Machine Learning, Penn State University; Workshop on Numerical Analysis and Scientific Computation of PDEs, Shenzhen;

- 2024** Scientific Computing Colloquium, Southern Methodist University; Plenary speaker, Midwest Numerical Analysis Day, Iowa City; Workshop on nonlocality: Challenges in Modeling and Simulation, Brown University; Wenjun Wu Distinguished Lecture, Shanghai Jiaotong University; Department of Mathematics, Yunan University of Finance and Economics, Kunming; International Workshop on Numerical and Learning Methods for PDEs, Tianyuan International Center of Mathematics Exchange, Yunan; The 2nd International Conference on Mathematical Modeling and Numerical Methods, BICMR, Peking University; Workshop on Mathematics of Multiscale and Multiphysics Phenomena in Materials Science, Banff International Research Station; International Conference Modern Perspectives in Applied Mathematics: Theory and Numerics of PDEs, ETH, Zurich; Tutorial lectures at the summer school for the International Conference on Scientific Computation and Differential Equations (SciCADE), Institute of Mathematical Sciences, Singapore; Workshop on Theoretical and computational aspects of materials science, Tuscaloosa, AL; Workshop on Multiscale Problems: Algorithms, Numerical Analysis and Computation, HIM, Bonn; Department of Mathematics, Old Dominion University; Department of Mathematics, Ohio State University; Applied Mathematics and Computational Sciences Colloquium, KAUST;
- 2023** AMS Special Session on Nonlocal Frameworks in Analysis and Mathematical Modeling, JMM2023, Boston; Mathematics Colloquium, University of Delaware; Mathematics Colloquium, University of Montana; Plenary lecture, the seventh international conference on scientific computing and partial differential equations, Hong Kong; Mathematics and Applied Mathematics Colloquium, Waseda University; Plenary speaker, 2nd Mathematics and Statistics PDE Conference, UNCG; Semi-Plenary lecture, Foundation of Computational Mathematics (FoCM), Soborne University; Distinguished Scientist Lecture, Academy of Mathematical and System Sciences, CAS; Plenary lecture, second annual conference of HKSIAM, Hong Kong; Workshop on Innovations in Fractional Calculus and Applications to Functional and Biological Materials, Lausanne, Switzerland; International Workshop on Computational Mathematics, Zhejiang; Plenary lecture, Inaugural meeting of SIAM NewYork-NewJersey-Pennsylvania Section, NJIT;
- 2022** Ireland Numerical Analysis Forum, virtual; Colloquium, Beijing International Center of Mathematics Research (virtual); Numerical analysis and scientific computing seminar, Courant Institute, NYU; SIAM Invited Address at the Joint Mathematics Meeting, Seattle (virtual); Colloquium at LadHyx, Ecole Polytechnique, Paris; Keynote Speaker, Spheric 2022, Catalina; Workshop on interface problems: modeling, theory and numerics, CUHK-Shenzhen, China (virtual); Workshop on Theoretical and Applied Aspects for nonlocal Models, Banff, Canada; Mid-Atlantic Numerical Analysis Day, Philadelphia; Conference on Applied Analysis: from the calculus of variations to materials science, finance and data science, Flatiron Institute, NYC; Herbert Keller Colloquium, CalTech; Distinguished Lecture, HK Poly University; Computational Mathematics Seminar, UC Irvine; The International Conference on New Trends in Computational and Data Sciences, Pasadena;
- 2021** IAS-HKSIAM Conference on Industrial and Applied Mathematics, IAS, Hong Kong; MATH-IMS Joint Applied Mathematics Colloquium, CUHK; Minisymposium on Learning Dynamics from Data for Prediction and Control, SIAM Conference on Computational Science and Engineering (virtual); School of Mathematics, Georgia Tech (virtual); Tutorial on nonlocal models, National Tianyuan Research Center, Wuhan (virtual); Department of Mathematics, Purdue University (virtual); HKSIAM Distinguished Colloquium (virtual); Department of Mathematics, Yale University (virtual); John H. Barrett Memorial Lectures, Univ of Tenn at Knoxville (virtual); Plenary lecture, SIAM Conference on Mathematical Aspects of Materials Science (virtual); Plenary lecture, 15th Free Boundary Problems, Berlin (virtual); CAM seminar, Cornell University; ZHACM colloquium, ETH, Zurich (virtual); RAMSES21, SISSA, Italy (virtual);
- 2020** Boeing distinguished colloquium, University of Washington, Seattle; School of Mathematics, Henan University (Online); International Conference on Computational Mathematics and Scientific Computing, Chinese

Adademy of Sciences (Online); Computational and Applied Mathematics Seminar, Department of Mathematics, Iowa State University; Sayas Numerical Analysis Seminar, (Zoom); Nine-Chapter Mathematics and Interdisciplinary Sciences Forum, Lanzhou University (Online); TianYuan Central China center, (Online); Program in Applied and Computational Mathematics, University of Chicago (Zoom); APAM research conference, Columbia University (Zoom); Modeling and Simulations in Materials Science online seminar, BNU/Wuhan/CityU/CAS (Zoom); Operations Research forum, Chineses OR Society (Zoom);

- 2019** Workshop on Phase Field Problems, recent development and applications, USTC, China; Distinguished alumni lecture, USTC, China; Colloquium, School of Mathematics, Capital Normal University, China; Distinguished Speaker Series, Ocean University of China; Conference on advanced Numerical Methods for Scientific Computation, SUST; International Conference on Interface Problems in Fluids and Solids, SCNU, China; Minisymposia on Nonlocal Modeling, Analysis, and Computation, ICIAM, 2019, Valencia, Spain; Applied Mathematics Research Center, Tsinghua University, Beijing, China; Annual Meeting of Chinese Society of Industrial and Applied Mathematics, Fushan, China;
- 2018** USACM Workshop on Nonlocal Methods in Fracture, Austin, TX; Summer school on fractional and other nonlocal models, Bilbao, Spain. International Workshop on Computational Mathematics, Suzhou, China; An International Conference on Nonlinear PDEs and Its Applications, Shanghai, China; School of Mathematics, Fudan University, China; NSF-SIAM Minisymposium on the NSF DMREF Program, Portland, OR; Minisymposium on Variational Methods in Material Sciences, SIAM Conference on Mathematical Aspects of Materials Science, Portland, OR; ICM satellite conference on industrial and applied mathematics, Foz do Iquacu, Brazil; International Congress of Mathematicians, Rio de Janeiro, Brazil; PICS/CAM Seminar, Univ of Penn., Philadelphia; Celebrating 75 Years of Mathematics of Computation, ICERM, Providence, RI; ARO MURI review meeting at ARL, Aberdeen Proving Ground, MD; CAM-ICCM2018 Workshop on Numerical Analysis with Applications, Nanjing, China; Colloquium, School of Mathematics, Peking University, China;
- 2017** Institute of Applied Mathematics, Chinese Academy of Science; Department of Mathematics, HKUST; Department of Mathematics, Rutgers University; Department of Aerospace and Mechanical Engineering, University of Arizona; Plenary lecture at SIAM-SEAS section annual meeting, Tallahassee, FL; Workshop on Numerical Methods for Fractional-derivative Problems: Singularities and Fast Algorithms; Principal lecturer of NSF-CBMS regional research conference on Nonlocal Dynamics; IAS program on Scientific Computing, Hong Kong; Workshop on Computational Mathematics. Hong Kong; Frontier of Theory and Applications of Nonlinear PDEs, Hong Kong; Plenary lecture at International Conference on Recent Advances in Computational and Applied Mathematics Wuhan, China; School of Mathematics, CCNU, Wuhan; National Center for Mathematics and Interdisciplinary Sciences (NCMIS), CAS; Supercomputing center, CAS; Lecture series on advances in scientific frontier, UCAS,
- 2016** Institute of Mathematical Sciences, RenMin University, Beijing; Numerical Analysis Research Club (NARC), Columbia University; Inst. of Comp Eng and Sci (ICES), University of Texas at Austin; Courant Institute, NYU; Workshop on Multiscale Modeling and its Applications: From Weather and Climate Models to Models of Materials Defects, Fields Institute, Toronto; Minisymposium on mathematical modeling at microscopic, mesoscopic and macroscopic scales, SIAM MS16, Philadelphia; International Conference on Applied Mathematics, City University of Hong Kong; Joint IAS Distinguished lecture and the inaugural Distinguished lecture in Mathematics; HKUST; PIMS Workshop on Nonlocal Variational Problems and PDEs, UBC, Vancouver; Conference on *New Challenges in Mathematical Modeling and Numerical Simulation of Superfluids*, CIRM, France; *International conference "Calculus of Variations, Geometric Measure Theory, Optimal Transportation: from Theory to Applications*, Lyon, France; Conference on Topics in Applied Nonlinear Analysis: Recent Advances and New Trends, CMU, Pittsburgh; School of Engineering, Peking University; International Congress of Chinese Mathematicians, Beijing; Beijing Aeronautical Science and Technology Research Institute, Beijing; AFRL MURI Review Meeting, Dayton; USACM Thematic Conference on Isogeometric Analysis and Meshfree Methods, San Deigo; Workshop on Future Directions in Fractional Calculus Research and Applications, E. Lansing; International Conference on Transport Phenomena in Collective Dynamics; 2016 Taiwan Mathematics Society Annual Meeting The Third International Workshop on Development and Application of High-Order Numerical Methods, Hefei, China

• Other special program and tutorial lecturers:

- Tutorial lecturer for special programs on the mathematics of materials science, IMA (Sept 2004) NUS (Dec 2004) and NUS (July 2009);
- Tutorial lecturer on mesh generation and CVTs, IAPCM, Beijing, (2007);
- Tutorial lecturer on phase field modeling and simulations, Beijing Intern. Center for Mathematical Research and Peking University, (2008);
- Tutorial speaker for Workshop on Analysis of Multiphase Biomembranes; Centre de Recherches Mathematiques, McGill University, (2010);
- Main speaker, IMA Summer Graduate Program on Flow, Geometric Motion, Deformation, and Mass Transport in Physiological Processes, IMA, (July 2013);
- Tutorial speaker, Nonlocal Modeling, Analysis and Computation, Tianyuan Southeast Center (June 2020);
- Tutorial speaker, Workshop for Mathematical Contest in Modeling, Columbia (Feb 2021);
- Tutorial speaker on nonlocal models, International Conference on Scientific Computation and Differential Equations, Institute of Mathematical Sciences, Singapore;