Di Qi

Department of Mathematics
Purdue University
150 N University St
West Lafayette, IN 47907 U.S.A.

Phone: 347-735-0576

email: qidi@purdue.edu
URL: https://www.math.purdue.edu/ qi117/

Research Interests

• Theoretical and numerical analysis for turbulent flows
• Filtering, multiscale modeling, and information theory
• Statistical control methods for complex turbulent systems
• Turbulent diffusion of passive tracers and extreme events
• Uncertainty quantification and model reduction strategies
• Data-driven models and machine learning for complex systems

Academic Position

2021- Assistant Professor
Department of Mathematics, Purdue University

2021 - Affiliate
Department of Earth, Atmospheric, and Planetary Sciences, Institute for a Sustainable Future and Computational Interdisciplinary Graduate Program, Purdue University

2017-2021 Postdoctoral Associate
Courant Institute of Mathematical Sciences, New York University
Mentor: Andrew J. Majda

Education

2017 Ph.D. in Mathematics/Atmosphere and Ocean Science (with distinction)
Courant Institute of Mathematical Sciences, New York University, NY, USA
Advisor: Andrew J. Majda

2012 B.S. in Mathematics (major) and Physics (minor)
Shanghai Jiao Tong University, Shanghai, China
Advisor: Shi Jin

Thesis

D. Qi, *Strategies for Reduced-Order Models in Uncertainty Quantification of Complex Turbulent Dynamical Systems.* PhD Dissertation, New York University. May 2017.

Research Publications & Submissions

Journal articles (* indicates the corresponding author)

Submitted & In preparation:

Qi, D. (2025). Numerical experiments for filtering probability distributions of multiscale systems. *in preparation.*

Mohamad, M.A. and Qi, D. (2025). Modeling extreme events and intermittency in turbulent diffusion with a mean gradient. *in preparation.*

Wang, Z., Chen, N., and Qi, D. (2024). A closed-form nonlinear data assimilation algorithm for multi-layer flow fields. *submitted.*

Qi, D.* and Liu, J.-G. (2024). Oscillatory solutions at the continuum limit of Lorenz 96 systems. *submitted.*

Qi, D.* and Liu, J.-G. (2024). Coupled stochastic-statistical equations for filtering multiscale turbulent systems. *submitted.*

Gao, Y. and Qi, D.* (2024). Mean field games for controlling coherent structures in nonlinear fluid systems. *submitted.*

Published:

Cao, N. and Qi, D. (2024). The maintenance of coherent vortex topology by Lagrangian chaos in drift-Rossby wave turbulence. *Physics of Fluids, 36*(6).

Qi, D.* (2024). Unambiguous models and machine learning strategies for anomalous extreme events in turbulent dynamical system. *Entropy, 26*(6), 522.

Chen, N. and Qi, D.*. (2023). A physics-informed data-driven algorithm for ensemble forecast of complex turbulent systems. *Applied Mathematics and Computation, 466*, 128480.

Qi, D.* and Liu, J.-G. (2023). High-order moment closure models with random batch method for efficient computation of multiscale turbulent systems. *Chaos: An Interdisciplinary Journal of Nonlinear Science, 33,* 103133.

Covington, J., Qi, D., and Chen, N (2023). Effective statistical control strategies for complex turbulent dynamical systems. *Proceedings of the Royal Society A, 479*(2279), 20230546.

Cao, N. and Qi, D. (2023). Nearly-Integrable Flows and Chaotic Tangles in the Dimits Shift Regime of Plasma Edge Turbulence. *Physics of Plasmas, Special Collection on Turbulence in Plasmas and Fluids, 30*(9).

Qi, D.* and Harlim, J. (2023). A Data-Driven Statistical-Stochastic Surrogate Modeling Strategy for Complex Nonlinear Non-stationary Dynamics. *Journal of Computational Physics, 485*, 112085.

Qi, D.* and Liu, J.-G. (2023). A Random Batch Method for Efficient Ensemble Forecasts of Multiscale Turbulent Systems. *Chaos: An Interdisciplinary Journal of Nonlinear Science 33*(2), 023113.

Qi, D.* and Harlim, J. (2022). Machine Learning-Based Statistical Closure Models for Turbulent Dynamical Systems. *Philosophical Transactions of the Royal Society A 380.* no. 2229, 20210205

Qi, D.* and Vanden-Eijnden, E. (2022). Anomalous Statistics and Large Deviations of Turbulent Water Waves past a Step. *AIP Advances 12*(2), 025016.

Qi, D.*, Majda, A.J., and Cerfon, A.J. (2021). Dimits shift, avalanche-like bursts, and solitary propagating structures in the two-field Flux-Balanced Hasegawa-Wakatani model for plasma edge turbulence (Featured article). *Physics of Plasmas, 27*(10), p.102304.

Qi, D.* and Majda, A.J. (2021). Nonlinear interaction and turbulence transition in the limiting regimes of plasma edge turbulence. *Research in the Mathematical Sciences, 7*(3), 1-32.

Moore, M.N.J., Bolles, C.T., Majda, A. J., and Qi, D. (2020). Anomalous waves triggered by abrupt depth changes: Laboratory experiments and truncated KdV statistical mechanics. *Journal of Nonlinear Science.*

Qi, D.* and Majda, A.J. (2020). Flux-balanced two-field plasma edge turbulence in a channel geometry. *Physics of Plasmas, 27*(3), p.032304.

Qi, D.* and Majda, A.J. (2020). Using machine learning to predict extreme events in complex systems. *Proceedings of the National Academy of Sciences, 117*(1), 52-59.

Majda, A.J., and Qi, D.* (2019). Statistical phase transitions and extreme events in shallow water waves with an abrupt depth change. *Journal of Statistical Physics*, pp. 1-24.

Majda, A.J., and Qi, D.* (2019). Linear and nonlinear statistical response theories with prototype applications to sensitivity analysis and statistical control of complex turbulent dynamical systems. *CHAOS: An Interdisciplinary Journal of Nonlinear Science, 29*(10), p. 103131.

Qi, D., Majda, A.J., and Cerfon, A.J. (2019). A flux-balanced model for collisional plasma edge turbulence: numerical simulations with different aspect ratios. *Physics of Plasmas, 26*(8), p.082303.

Qi, D.*, and Majda, A.J. (2019). Zonal jet creation from secondary instability of drift waves for plasma edge turbulence. *Chinese Annals of Mathematics, Series B, 40*(6), pp. 869-890.

Qi, D.*, and Majda, A. J. (2019). Linking the two-field dynamics of plasma edge turbulence with the one-field balanced model through systematic unstable forcing at low resistivity. *Physics of Plasmas, 26*(5), p. 052108.

Qi, D.*, and Majda, A.J. (2019). Transient metastability and selective decay for the coherent zonal structures in plasma edge turbulence. *Journal of Nonlinear Science*, pp. 1-43.

Majda, A.J., and Qi, D.* (2019). Using statistical functionals for effective control of inhomogeneous complex turbulent dynamical systems. *Physica D: Nonlinear Phenomena, 392*, pp. 34-56.

Majda, A.J., Moore, M.N.J., and Qi, D.* (2019). A statistical dynamical model to predict extreme events and anomalous features in shallow water waves with abrupt depth change. *Proceedings of the National Academy of Sciences, 116*(10), pp. 3982-3987.

Majda, A.J., Qi, D., and Cerfon, A.J. (2018). A flux-balanced fluid model for collisional plasma edge turbulence: model derivation and basic physical features. *Physics of Plasmas, 25*(10), p.102307.

Qi, D.*, and Majda, A.J. (2018). Rigorous statistical bounds in uncertainty quantification for one-layer turbulent geophysical flows. *Journal of Nonlinear Science, 28*(5), pp. 1709–1761.

Qi, D.*, and Majda, A.J. (2018). Predicting extreme events for passive scalar turbulence in two-layer baroclinic flows through reduced-order stochastic models. *Communications in Mathematical Sciences, 16*(1), pp.17–51.

Majda, A.J., and Qi, D.* (2018). Strategies for reduced-order models for predicting the statistical responses and uncertainty quantification in complex turbulent dynamical systems. *SIAM Review, 60*(3), 491–549.

Majda, A.J., and Qi, D.* (2017). Effective control of complex turbulent dynamical systems through statistical functionals. *Proceedings of the National Academy of Sciences, 114*(22), pp. 5571–5576.

Qi, D.*, and Majda, A.J. (2017). Low-dimensional reduced-order models for statistical response and uncertainty quantification: barotropic turbulence with topography. *Physica D: Nonlinear Phenomena, 343*, pp. 7–27.

Lee, Y., Majda, A.J., and Qi, D. (2017). Preventing catastrophic filter divergence using adaptive additive inflation for baroclinic turbulence. *Monthly Weather Review, 145*(2), pp. 669–682.

Qi, D.*, and Majda, A.J. (2016). Low-dimensional reduced-order models for statistical response and uncertainty quantification: two-layer baroclinic turbulence. *Journal of the Atmospheric Sciences, 73*(12), pp. 4609–4639.

Lee, Y., Majda, A.J., and Qi, D. (2016). Stochastic superparameterization and multiscale filtering of turbulent tracers. *Multiscale Modeling & Simulation, 15*(1), pp. 215–234.

Majda, A.J., and Qi, D.* (2016). Improving prediction skill of imperfect turbulent models through statistical response and information theory. *Journal of Nonlinear Science, 26*(1), pp. 233–285.

Qi, D.*, and Majda, A.J. (2015). Predicting fat-tailed intermittent probability distributions in passive scalar turbulence with imperfect models through empirical information theory. *Communications in Mathematical Sciences, 14*(6), pp. 1687–1722.

Qi, D.*, and Majda, A.J. (2015). Blended particle methods with adaptive subspaces for filtering turbulent dynamical systems. *Physica D: Nonlinear Phenomena, 298*, pp. 21–41.

Majda, A.J., Qi, D., and Sapsis, T.P. (2014) Blended particle filters for large-dimensional chaotic dynamical systems. *Proceedings of the National Academy of Sciences, 111*(21), pp. 7511–7516.

Teaching Experiences

Spring 2025 *Instructor*
MA 595. Special Topics in Filtering Complex Fluid Systems
MA 362. Topics in Vector Calculus

Department of Mathematics, Purdue University

Fall 2024 *Instructor*
MA 504. Real Analysis
MA 598. Reading Course on Geophysical Fluid Dynamics
Department of Mathematics, Purdue University

Spring 2024 *Instructor*
MA 303. Differential Equations and PDE
Department of Mathematics, Purdue University

Fall 2023 *Instructor*
MA 573. Numerical Solutions of ODEs and dynamical systems
Department of Mathematics, Purdue University

Spring 2023 *Instructor*
MA 510. Vector Calculus
Department of Mathematics, Purdue University

Fall 2022 *Instructor*
MA 35301. Linear Algebra II
Department of Mathematics, Purdue University

Spring 2022 *Instructor*
MA 303: Differential Equations and PDE
Department of Mathematics, Purdue University

Fall 2019 *Instructor*
Advanced Topics in Applied Math: Uncertainty Quantification In Turbulent Dynamical Systems
Courant Institute, New York University

Fall 2018 *Instructor*
Advanced Topics in Applied Math: Filtering Turbulent Signals in Complex Systems
Courant Institute, New York University

Fall 2016 *Instructor*
Advanced Topics in Applied Math: Turbulent Dynamical Systems
Courant Institute, New York University

Fall 2015 *Co-Instructor*
Advanced Topics in Applied Math: Quantifying Uncertainty in Complex Turbulent Systems
Courant Institute, New York University

Fall 2014 *Co-Instructor*
Advanced Topics in Applied Math: Filtering Turbulent Signals in Complex Systems
Courant Institute, New York University

Students & Postdocs

Postdocs:

2024 - current Changhong Mou

Graduate students:

2024 - current Jiarui Huang (Math)
2025 - current Aristha Deb (Math, co-advised with Guang Lin)
2025 - current Alejandro Cano (Math, co-advised with Guang Lin)
2024 - current Zhilin Gong (EAPS, co-advised with Wen-wen Tung)
2024 - current Rishabh Gupta (EAPS, co-advised with Wen-wen Tung)

Undergraduate students:

2023 - current Vlada Volyanskaya
2023 - 2024 Yufan Zhou
2022 - 2024 Shubham Shrivastava

Professional Service

Conference & Workshops Organized:

5/2025 *Co-organizer*, 2025 SIAM Conference on Dynamical Systems
Data Driven and Reduced-Order Methods in Dynamical Systems

12/2024 *Co-organizer*, AGU Fall meeting
Applied Math Perspectives on Modeling, Analyzing, and Predicting Complex Nonlinear Geophysical Systems

10/2024 *Co-organizer*, Materials Science & Technology
Advances in Multiphysics Modeling and Multi-modal Imaging of Functional Materials — Multimodal Imaging of Functional Materials

7/2024 *Co-organizer*, World Congress on Computational Mechanics
Mini-symposium: Hybrid Techniques in Data-Driven Modeling, Forecasting, and Uncertainty Quantification of Transport-Dominated Complex Multiscale Phenomena

2/2024 *Co-organizer*, 2024 SIAM Conference on Uncertainty Quantification
Mini-symposium: Statistical and Data-Assisted Modeling Approaches for Forecasting and Uncertainty Quantification of Complex Multiscale Systems in Real-World Applications

12/2023 *Co-organizer*, AGU Fall meeting
Efficient Data-Driven Methods for Multiscale Stochastic Modeling and Uncertainty Quantification

8/2023 *Co-organizer*, ICIAM-Tokyo
Mini-symposium: Combining Machine Learning and Stochastic Methods for Modeling and Forecasting Complex Systems

5/2023 *Co-organizer*, 2023 SIAM Conference on Dynamical Systems
Mini-symposium: Reduced Order Modeling and Forecasting in Geophysical Flows and Complex

Dynamical Systems

7/2022 *Co-organizer*, 2022 SIAM Annual Meeting
Mini-symposium: Data-driven Models and Machine Learning Strategies for Complex Dynamical Systems

3/2022 *Co-organizer*, AMS Spring Central Sectional Meeting
Special Session on Modeling and Forecasting Complex Turbulent Systems

12/2021 *Co-organizer*, AGU Fall Meeting
Advances in Computational Analysis in Geophysical Processes: Applied Mathematics Perspectives on Prediction, Uncertainty Quantification, and State Estimation

7/2019 *Co-organizer*, ICIAM-Valencia
Mini-symposium: State estimation, prediction, and uncertainty quantification in geophysics

Committee Service:

2024 Engineering Services Committee

Editorial Service:

2024 Guest Editor in Entrophy Special Issue on *An Information-Theoretical Perspective on Complex Dynamical Systems*

Journal Referee:

Physica D • SIAM Journal on Scientific Computing • Journal of Computational Physics • Multiscale Modeling and Simulation • Research in the Mathematical Sciences • Chaos: An Interdisciplinary Journal of Nonlinear Science • Journal of Plasma Physics • Philosophical Transactions A • Foundations of Data Science • Nonlinear Dynamics • Journal of Engineering Mathematics • The European Physical Journal ST • Entropy • Journal of the Atmospheric Sciences • Ocean Modelling • International Journal for Numerical Methods in Engineering • IEEE Access • Mathematics • Stats • Applied Sciences
Reviewed book by *Chapman & Hall/CRC Press*

Reviewer for Mathematical Reviews (AMS)

Supervising Student Research:

Goldwater fellowship review and nominee committee for evaluating outstanding undergraduate research applicants

Ph.D. Thesis Defense Committee of Senwei Liang (Math), Chen Zhang (EAPS)
Ph.D. Committee Member of Gareth Hardwick (Math), Ka-Ying Ho (EAPS), Xiangyu Liu (EAPS), Yikai Liu (EAPS), Zhaoyu Liu (EAPS)

Designed an undergraduate ISF-DUIRI research and learning project *Statistical and Deep Learning of High-Resolution Rainfall for Midwest Urban Sustainability Study*, 2023.

Outstanding Student Presentation Award (OSPA) judge and liaison, American Geophysical Union Fall Meeting, 2021.

Conferences & Workshops

12/2024 *Filtering and control of multiscale turbulent systems*, 14th American Institute of Mathematical Sciences (AIMS) conference, Abu Dhabi, UAE, December, 2024.

12/2023 *Coupled stochastic-statistical equations for filtering turbulent geophysical systems*, AGU Fall Meeting, Washington, D.C., December 2024.

10/2024 *A data-driven statistical-stochastic model for multiscale turbulent systems*, SIAM Conference on Mathematics of Data Science (MDS24), Atlanda, GA, October 2024.

7/2024 *Reduced-order closure models with random batch method for multiscale turbulent systems*, 11th European Nonlinear Dynamics Conference (ENOC2024), Delft, Netherlands, July 2024.

7/2024 *Reduced-order models for data assimilation and control of multiscale turbulent systems*, SIAM Annual Meeting (AN24), Spokane, WA, July 2024.

2/2024 *Reduced-order moment closure models with random batch method for complex multiscale systems*, SIAM Conference on Uncertainty Quantification (UQ24), Trieste, Italy, Februrary 2024.

12/2023 *Statistical reduced-order models and closure strategies for turbulent geophysical flows*, AGU Fall Meeting, San Francisco, CA, December 2023.

5/2023 *Statistical reduced-order models and data-driven closure strategies for turbulent systems*, SIAM Conference on Dynamical Systems (DS23), Portland, OR, May 2023.

3/2023 *Reduced-order models and data-driven closure strategies for turbulent systems*, Mathematical Approaches of Atmospheric Constituents Data Assimilation and Inverse Modeling, BIRS, Canada, March 2023

12/2022 *Data-driven statistical-stochastic model for effective ensemble forecast of complex systems*, AGU Fall Meeting, Chicago, IL, December 2022.

11/2022 *Statistical reduced-order models and data-driven closure strategies for turbulent systems*, Machine Learning for Climate and Weather Applications, IMSI Workshop, Chicago, IL, November 2022.

7/2022 *Statistical reduced-order models and closure strategies for turbulent systems*, SIAM Conference on Mathematics of Planet Earth (MPE22), Pittsburgh, PA, July 2022.

4/2022 *Reduced-order models and machine learning-based closure for turbulent systems*, SIAM Conference on Uncertainty Quantification (UQ22), Atlanta, GA, April 2022.

3/2022 *Predicting extreme events and anomalous statistics of turbulent water waves*, AMS Spring Central Meeting, West Lafayette, IN, March 2022.

12/2021

Statistical reduced-order models and closure strategies for turbulent geophysical flows, AGU Fall Meeting, New Orleans, LA, December 2021.

7/2021 *Suppression of turbulent transport by zonal flows in magnetized plasmas (virtual)*, SIAM Annual Meeting (AN21), July 2021.

1/2021 CIB-EPFL workshop: Linear Response: Rigorous Results and Applications (virtual), January 2021.

12/2019 *Statistical reduced models for uncertainty quantification of turbulent geophysical flows*, AGU Fall Meeting, San Francisco, CA, December 2019.

10/2019 *Transition from drift wave turbulence to coherent zonal structures in plasma edge turbulence*, 61st Annual Meeting of the APS Division of Plasma Physics (DPP), Fort Lauderdale, Florida, October 2019.

7/2019 *Statistical reduced models and rigorous analysis for uncertainty quantification of turbulent geophysical flows*, Scientific Grand Challenges and New Perspectives in Applied Mathematics: Ocean, Atmosphere and Climate Sciences, University of Victoria, Canada, July 2019.

7/2019 *Reduced-order statistical models for predicting statistical responses and extreme events in geophysics*, International Congress on Industrial and Applied Mathematics, Valencia, Spain, July 2019.

5/2019 *Reduced-order statistical models for predicting mean responses and extreme events in barotropic turbulence*, SIAM Conference on Applications of Dynamical Systems (DS19), Snowbird, Utah, May 2019.

5/2019 *Rigorous statistical bounds in uncertainty quantification for turbulent geophysical flows*, Workshop on Data Assimilation: Methodology and Applications, Centre de Recherches Mathématiques (CRM), Université de Montréal, Canada, May 2019.

3/2019 *Statistical reduced models and rigorous analysis for uncertainty quantification of turbulent geophysical flows*, A Conference to Celebrate the 70th Birthday of Andrew Majda, Courant Institute, New York, NY, March 2019.

12/2018 *Statistical bounds for turbulent geophysical flows in uncertainty quantification*, Nonlinear PDEs from Oceanic and Atmospheric Dynamics and Related Topics, Guangzhou, China, December 2018.

12/2018 *Rigorous statistical bounds in uncertainty quantification for turbulent geophysical flows*, Applied Mathematics and Statistics Youth Forum, Peking University, Beijing, China, December 2018.

7/2018 *Statistical Response in Uncertainty Quantification through Reduced-order Models*, SIAM Annual Meeting, Portland, OR, July 2018.

4/2018 *Predicting Statistical Responses and Extreme Events in Turbulent Systems through Low-Dimensional Reduced-Order Models*, SIAM Conference on Uncertainty Quantification, Garden Grove, CA, April 2018.

12/2017 *Low-Dimensional Reduced-Order Models for Statistical Response and Uncertainty Quantification in Turbulent Systems*, AGU Fall Meeting, New Orleans, LA, December 2017.

5/2017

Predicting Extreme Events for Passive Scalar Turbulence through Reduced-Order Models, SIAM Conference on Applications of Dynamical Systems (DS17), Snowbird, Utah, May 2017.

12/2016 *Statistical Response in Two-layer Baroclinic Turbulence for Uncertainty Quantification* (Poster), AGU Fall Meeting, San Francisco, CA, December 2016.

10/2016 *Low-Dimensional Reduced-Order Models for Statistical Response and Uncertainty Quantification*, MURI 2016 workshop, New York University, October 2016.

5/2016 *Preventing Catastrophic Filter Divergence Using Adaptive Additive Inflation for Baroclinic Turbulence* (Poster), The seventh EnKF Data Assimilation Workshop, State College, PA, May 2016.

4/2016 *Improving Prediction Skill of Imperfect Turbulent Models through Empirical Information Theory*, SIAM Conference on Uncertainty Quantification, EPFL, Lausanne, Switzerland, April 2016.

8/2015 *Blended Particle Filters for Large Dimensional Chaotic Dynamical Systems*, Mathematics of Geophysical Flows and Turbulence, Fudan University, Shanghai, August 2015.

8/2015 *Improving prediction skill of imperfect turbulent models through statistical response and information theory*, Mathematics of Geophysical Flows and Turbulence, Fudan University, Shanghai, August 2015.

8/2015 *Developing Imperfect Turbulent Models through Statistical Response and Information Theory*, The eighth International Congress on Industrial and Applied Mathematics, Beijing, China, August 2015.

6/2014 *Filtering Turbulent Signals in Fourier Space: Fourier Domain Kalman Filter*, Short Course in High Dimensional Filtering, University of Warwick, UK, June 2014.

3/2014 *Blended Particle Filters for Large Dimensional Chaotic Dynamical Systems*, SIAM Conference on Uncertainty Quantification, Savannah, Georgia, March 2014.

1/2014 *Blended Particle Filters for Large Dimensional Chaotic Dynamical Systems*, MURI 2014 workshop, New York University, NY, January 2014.

Seminar Talks

10/2024 *Mean field control for multiscale turbulent geophysical flows*, University of Minnesota, March 2025.

9/2024 *Statistical-stochastic model for filtering turbulent phenomena*, Applied Physics and Applied Mathematics, Columbia University, November 2024.

3/2024 *Random batch methods for multiscale complex systems*, Applied and Computational Math Seminar, University of Wisconsin-Madison, March 2024.

12/2023 *Reduced-order models and closure strategies for turbulent systems*, CCAM Seminar, December 2023.

7/2023 *Reduced-order closure models and ensemble methods for complex multiscale systems*, AI + Math Colloquia, Shanghai Jiao Tong University, July 2023.

11/2022

Reduced-order models and data-driven closure strategies for turbulent systems, Applied Math & Analysis Seminar, Duke University, November 2022.

3/2022 *Statistical reduced-order models and machine learning-based closure strategies for turbulent dynamical systems*, Numerical Analysis Seminar, North Carolina State University, March 2022.

3/2022 *Predicting extreme events and anomalous features in complex turbulent systems*, Bridge to Research Seminar, Purdue University, March 2022.

11/2021 *Research conservation: stochastic models for turbulence*, PCCRC, Purdue University, November 2021.

11/2021 *Statistical reduced-order models and closure strategies for turbulent geophysical flows*, Storm Snacks, EAPS, Purdue University, November 2021.

10/2021 *Statistical reduced-order models and closure strategies for turbulent dynamical systems*, Mathematics Colloquium, United States Naval Academy, October 2021.

9/2021 *Statistical reduced models and rigorous analysis for uncertainty quantification in turbulent dynamical systems*, CCAM Seminar, Purdue University, September 2021.

4/2021 *Creation of coherent zonal structures from selective decay and secondary instability (virtual)*, Applied Analysis Group Seminar, University of Bremen, April 2021.

3/2021 *Predicting extreme events and anomalous features using a statistical dynamical model and machine learning (virtual)*, Institute of Natural Sciences, Shanghai Jiao Tong University, March 2021.

2/2020 *Predicting extreme events and anomalous features using a statistical dynamical model and machine learning*, Special Data Science Colloquium, Purdue University.

1/2020 *Predicting extreme events and anomalous features using a statistical dynamical model and machine learning*, Computational and Applied Mathematics Colloquium, Penn State.

1/2020 *Statistical reduced models and rigorous analysis for uncertainty quantification of turbulent dynamical systems*, Mathematics Colloquium, University of Illinois at Urbana-Champaign.

12/2019 *Statistical reduced models and rigorous analysis for uncertainty quantification of turbulent dynamical systems*, Mathematics Colloquium, University at Buffalo, SUNY.

4/2019 *Statistical reduced models and rigorous analysis for uncertainty quantification of turbulent geophysical flows*, Mathematical Sciences Colloquium, Rensselaer Polytechnic Institute.

4/2019 *Creation of coherent zonal structures from selective decay and secondary instability*, Atmosphere Ocean Science Colloquium, Courant Institute.

10/2018 *Rigorous statistical bounds in uncertainty quantification for turbulent geophysical flows*, Graduate Student / Postdoc Seminar, Courant Institute.

5/2017 *Predicting Extreme Events for Passive Scalar Turbulence through Reduced-Order Models*, CAOS Student Seminar, Courant Institute

2/2016

Low-Dimensional Reduced-Order Models for Statistical Response and UQ, CAOS Student Seminar, Courant Institute.

2/2015 *Improving Prediction Skill of Imperfect Turbulent Models through Statistical Response and Information Theory*, CAOS Student Seminar, Courant Institute.

2/2014 *Blended Particle Filter for Large Dimensional Chaotic Dynamical Systems*, CAOS Student Seminar, Courant Institute.

10/2013 *Statistical Dynamics For Uncertainty Quantification Of Quadratic System*, CAOS Monday Lunch Seminar.

8/2013 *Filtering Linear Systems and Observability*, Summer Discussion Group, Courant Institute.

4/2013 *Blended reduced subspace algorithms for uncertainty quantification*, CAOS Student Seminar, Courant Institute.

Grants & Research Support

Current PI, National Science Foundation (NSF), DMS-2407361, $203,648, 2024 – 2027.
Reduced-Order Multiscale Models for Uncertainty Quantification, Data Assimilation and Control

Current PI, Office of Naval Research (ONR), N00014-24-1-2192, $301,655, 2023 – 2026.
Analytically Tractable Strategies for Modeling Extreme Events and Anomalous Statistics in Turbulent Multiscale Systems

Past PI, PCCRC Seed Grant, Purdue University, $25,000, 2021 – 2023.
Innovative Solutions to Climate Problem and Long-term Impact

Press Release

11/2018 Strategies for Predicting Statistical Responses in Complex Turbulent Systems
CAOS News & Research
https://caos.cims.nyu.edu/dynamic/news/10/

Honors & Awards

2018 New World Mathematics Awards for Doctor Thesis
2017 Kurt O. Friedrichs prize for an outstanding dissertation in mathematics, New York University
2012–2017 New York University MacCracken Graduate Scholarship, New York University
2011 China Undergraduate Mathematical Contest in Modeling (first Class Prize)
2010 Mathematical Contest in Modeling (Meritorious Winner)
2008–2010 Academic Excellence Scholarship (A class), Shanghai Jiao Tong University
2008 Samsung scholarship (1st Class), Shanghai Jiao Tong University