

Quanjun Lang

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Work Experience

- Assistant Professor, Penn State University 2026-08—Present
- William W. Elliott Assistant Research Professor of Mathematics, Duke University 2023-08—2026-07
Mentors: Drs. Jianfeng Lu and Jonathan Mattingly

Education

- Ph.D. in Mathematics, Johns Hopkins University 2017-08—2023-08
Advisors: Drs. Fei Lu and Yannick Sire
- B.S. in Mathematics and Applied Mathematics, Sun Yat-sen University 2013-07—2017-06

Research Interests

Machine learning theory and scientific computing, with a focus on learning in dynamical systems, including interacting particle systems, quantum dynamics, and non-Markovian systems with memory. Emphasizes intrinsic low-rank structures, efficient model reduction, and rigorous analysis of error, sample complexity, and convergence of optimization methods; additional interests include data assimilation, inverse problems, and regularization.

Awards

- American Mathematical Society, AMS-Simons Travel Grant 2026-06
- Duke University, Lewis Blake Award for Excellence in Teaching 2025-09
- SIAM Travel Award 2025-09
- SIAM Travel Award 2025-03
- Sun Yat-sen University, Award for Outstanding Undergraduate Thesis 2017-08
- Sun Yat-sen University, Outstanding Undergraduate 2017-08

Publications

- Quanjun Lang, and Fei Lu. “Learning interaction kernels in mean-field equations of first-order systems of interacting particles.” *SIAM Journal on Scientific Computing*. 44.1: A260–A285. [[doi](#), [arXiv](#)]
- Quanjun Lang, and Fei Lu. “Identifiability of interaction kernels in mean-field equations of interacting particles.” *Foundations of Data Science*. 5(4): 480–502. [[doi](#), [arXiv](#)]
- Fei Lu, Quanjun Lang, and Qingci An. “Data adaptive RKHS Tikhonov regularization for learning kernels in operators.” *Proceedings of Mathematical and Scientific Machine Learning (PMLR)*. 190: 158–172. [[conference](#), [arXiv](#)]
- Neil K. Chada, Quanjun Lang, Fei Lu, and Xiong Wang. “A data-adaptive prior for Bayesian learning of kernels in operators.” *Journal of Machine Learning Research*. 25(317): 1–37. [[journal](#), [arXiv](#)]
- Fabrice Baudoin, Quanjun Lang, and Yannick Sire. “Extension method in Dirichlet spaces with sub-Gaussian estimates and applications to regularity of jump processes on fractals.” *Communications in Analysis and Geometry*. 33(8): 1931–1973. [[doi](#), [arXiv](#)]
- Quanjun Lang, and Jianfeng Lu. “Learning memory kernels in generalized Langevin equations.” *SIAM Journal on Mathematics of Data Science*. 8(1): 141–166. [[doi](#), [arXiv](#)]

- Yuan Gao, Quanjun Lang, and Fei Lu. “Self-test loss functions for learning weak-form operators and gradient flows.” *Journal of Scientific Computing*. 108(1): 28. [doi, arXiv]
- Quanjun Lang, Xiong Wang, Fei Lu, and Mauro Maggioni. “Interacting particle systems on networks: joint inference of the network and the interaction kernel.” *Applied and Computational Harmonic Analysis*. 84: 101867. [doi, arXiv]

Submitted Preprints

- Quanjun Lang, and Jianfeng Lu. “Error estimates for learning and approximating generalized Langevin equations.” [arXiv]
- Quanjun Lang, and Jianfeng Lu. “A unified blockwise measurement design for learning quantum channels and Lindbladians via low-rank matrix sensing.” [arXiv]
- Fabrice Baudoin, Quanjun Lang, and Yannick Sire. “Powers of generators on Dirichlet spaces and applications to Harnack principles.” [arXiv]
- Quanjun Lang, and Fei Lu. “Small noise analysis for Tikhonov and RKHS regularizations.” [arXiv]
- Quanjun Lang, Xiong Wang, Fei Lu, and Mauro Maggioni. “Learning multi-type heterogeneous interacting particle systems.” [arXiv]

Other Manuscripts

- Quanjun Lang. “Learning kernels with nonlocal dependence in mean-field equations and the extension problem on Dirichlet space.” (2023, Ph.D. Thesis).
- Quanjun Lang. “Spectral theory and application of linear operators.” (2017, Bachelor Thesis, English version, Best Thesis Award).

Invited Talks

- SIAM Conference on Computational Science and Engineering (CSE27) [2027.02]
- SIAM Conference on Mathematics of Data Science (MDS26) [2026.11]
- SIAM New York-New Jersey-Pennsylvania Section Annual Conference [2026.10]
- SIAM Annual Meeting (AN26) 2026-07
- SIAM Conference on Uncertainty Quantification (UQ26) 2026-03
- PSU–Purdue–UMD Joint Seminar on Mathematical Data Science 2026-02
- Wayne State University, Mathematics Colloquium Talk 2026-02
- Oregon State University, Mathematics Colloquium Talk 2026-02
- Joint Mathematics Meetings 2026 2026-01
- Zhejiang University, Center for Interdisciplinary Applied Mathematics 2026-01
- Fudan University, Fudan-Guanghai International Forum 2025-12
- Shanghai Jiao Tong University, Winter Young Mathematician Forum 2025-12
- Louisiana State University, Mathematics Colloquium Talk 2025-11
- SIAM Central States Section Annual Meeting 2025-10
- SIAM Conference on Applications of Dynamical Systems (DS25) 2025-05
- SIAM Conference on Computational Science and Engineering (CSE25) 2025-03
- Great Bay University, Applied Math Seminar 2024-08
- IMSI, Data Sciences for Mesoscale and Macroscale Materials Models 2024-05

- Duke University, Probability Seminar 2024-01
- Tianyuan Institute, Stochastic Dynamical Systems and Machine Learning Seminar 2023-11
- Duke University, Applied Math and Analysis Seminar 2023-02
- SIAM Conference on Computational Science and Engineering (CSE21) 2021-03

Poster Presentations

- Emergent Behavior in Complex Systems of Interacting Agents, IMSI 2025-03
- SIAM Washington, D.C.-Baltimore Section Annual Meeting 2024-12
- SIAM Conference on Mathematics of Data Science (MDS24) 2024-10
- Fourth Symposium on Machine Learning and Dynamical Systems, Fields Institute 2024-07
- Third Symposium on Machine Learning and Dynamical Systems, Fields Institute 2022-09

Academic Service

Event Organization

- Co-organizer , Delaware-Indiana-Maryland-Ohio-Pennsylvania Joint Seminar on Mathematical Data Science 2026
- Co-organizer , with Ying Liang; CSE27 minisymposium on Inverse Problems and Learning of Operators and Dynamical Systems [2027.02]
- Co-organizer , with Naoki Masuda; UQ26 minisymposium on Interacting Particle Systems on Networks and Reduced-Order Modeling 2026-03

Journal Referee

- Chaos, Solitons Fractals
- Chaos
- Physica D: Nonlinear Phenomena
- SIAM Journal on Applied Mathematics
- IMA Journal of Numerical Analysis

Teaching

Penn State University

- MATH 225: Mathematical Foundations for Machine Learning Fall 2026

Duke University

- Math 531: Real Analysis Spring 2026
- Math 230: Undergraduate Probability Fall 2025
- Math 230: Undergraduate Probability Summer 2025
- Math 353: ODE and PDE Spring 2025
- Math 230: Undergraduate Probability Fall 2024
- Math 641: Graduate Probability Spring 2024
- Math 230: Undergraduate Probability Fall 2023

Johns Hopkins University

- AS.110.302: Differential Equations with Applications (TA) Summer 2023
- AS.110.445: Mathematical and Computational Foundations of Data Science (TA) Fall 2022
- AS.110.302: Differential Equations with Applications (TA) Summer 2022
- AS.110.109: Calculus II (TA) Spring 2022
- AS.110.302: Differential Equations with Applications (TA) Fall 2021
- AS.110.302: Differential Equations with Applications (TA) Summer 2021
- AS.110.201: Linear Algebra (TA) Summer 2021
- AS.110.201: Linear Algebra (TA) Spring 2021
- AS.110.302: Differential Equations with Applications (TA) Summer 2020
- AS.110.302: Differential Equations with Applications (TA) Fall 2019
- AS.110.302: Differential Equations with Applications (TA) Summer 2019
- AS.110.201: Linear Algebra (TA) Spring 2019
- AS.110.201: Linear Algebra (TA) Fall 2018
- AS.110.302: Differential Equations with Applications Summer 2018
- AS.110.201: Linear Algebra (Grader) Spring 2018
- AS.110.302: Differential Equations with Applications (Grader) Fall 2017