Ruiyi Yang

CONTACT INFORMATION
Fine Hall 209, Washington Road
Princeton University, Princeton, NJ 08544.
E-mail:ry8311@princeton.edu
Website: https://ruiyiyang.github.io

POSITION

Princeton University, Princeton, NJ. Aug 2022–present

- Postdoctoral Research Associate, Program in Applied and Computational Mathematics.
  Supervisor: Amit Singer.

EDUCATION

University of Chicago, Chicago, IL. Sep 2017–Jun 2022

- Ph.D. in Computational and Applied Mathematics.
  Advisor: Daniel Sanz-Alonso.

University of California, Los Angeles, Los Angeles, CA. Sep 2013–Jun 2017

- B.S. in Mathematics.
  College Honors Program.

PUBLICATIONS AND PREPRINTS

(Authors are ordered alphabetically in all papers.)

1. Bryon Aragam and Ruiyi Yang. Model-free Estimation of Latent Structure via Multiscale Nonparametric Maximum Likelihood. *arXiv preprint*, 2024. Preprint available at https://arxiv.org/abs/2410.22248.
2. Daniel Sanz-Alonso and Ruiyi Yang. Gaussian process regression under computational and epistemic misspecification. *To appear in SIAM Journal on Numerical Analysis*, 2024+. Preprint available at https://arxiv.org/abs/2312.09225
3. Amit Singer and Ruiyi Yang. Alignment of density maps in Wasserstein distance. *Biological Imaging*, 4:e5, 2024
4. Hwanwoo Kim, Daniel Sanz-Alonso, and Ruiyi Yang. Optimization on manifolds via graph Gaussian processes. *SIAM Journal on Mathematics of Data Science*, 6(1):1–25, 2024
5. Bryon Aragam and Ruiyi Yang. Uniform consistency in nonparametric mixture models. *The Annals of Statistics*, 51(1):362–390, 2023
6. Nicolás Garcia Trillos, Daniel Sanz-Alonso, and Ruiyi Yang. Mathematical foundations of graph-based Bayesian semi-supervised learning. *Notices of the American Mathematical Society*, 69(10), 2022
7. Daniel Sanz-Alonso and Ruiyi Yang. Finite element representations of Gaussian processes: Balancing numerical and statistical accuracy. *SIAM/ASA Journal on Uncertainty Quantification*, 10(4):1323–1349, 2022
8. Daniel Sanz-Alonso and Ruiyi Yang. Unlabeled data help in graph-based semi-supervised learning: a Bayesian nonparametrics perspective. *Journal of Machine Learning Research*, 23(97):1–28, 2022
9. Daniel Sanz-Alonso and Ruiyi Yang. The SPDE approach to Matérn fields: Graph representations. *Statistical Science*, 37(4):519–540, 2022
10. John Harlim, Daniel Sanz-Alonso, and Ruiyi Yang. Kernel methods for Bayesian elliptic inverse problems on manifolds. *SIAM/ASA Journal on Uncertainty Quantification*, 8(4):1414–1445, 2020
11. Nicolás García Trillos, Daniel Sanz-Alonso, and Ruiyi Yang. Local regularization of noisy point clouds: Improved global geometric estimates and data analysis. *Journal of Machine Learning Research*, 20(136):1–37, 2019

AWARDS

- Travel Award, SIAM Conference on Uncertainty Quantification. 2022
- Harper Dissertation Fellowship, University of Chicago. 2021
  In recognition of record or achievement and professional promise, one of University of Chicago's highest honors.

- Travel Award, SIAM Conference on Computational Science and Engineering. 2021
- Travel Award, SIAM Conference on Mathematics of Data Science. 2020
- Travel Award, GTDAML Graduate Student Conference. 2019

Talks

- Alignment of Density Maps in Wasserstein Distance. Oct 2024
  SIAM Conference on Mathematics of Data Science, Atlanta GA.
  Minisymposium: "Processing data with geometric structure: optimal transport and manifold learning".
- Optimization on Manifolds via Graph Gaussian Processes. Feb 2024
  University of California Davis MADDD Seminar.
- Optimization on Manifolds via Graph Gaussian Processes. Jan 2024
  IMS Young Mathematical Scientists Forum—Applied Mathematics, Singapore.
- Optimization on Manifolds via Graph Gaussian Processes. Mar 2023
  New Jersey Institute of Technology Statistics Seminar.
- Unlabeled Data Help in Graph-Based Bayesian Semi-Supervised Learning. Sep 2022
  SIAM Conference on Mathematics of Data Science, San Diego CA.
  Minisymposium: "Graph-Based Methods in Low-Label Rate Machine Learning".
- Graph-Based Approximation of Matérn Gaussian Fields. Aug 2022
  IMSI Workshop on Expressing and Exploiting Structure in Modeling, Theory, and Computation with Gaussian Processes, Chicago IL.
- Balancing Numerical and Statistical Accuracy in the SPDE Approach to Gaussian Processes.
  SIAM Conference on Uncertainty Quantification, Atlanta GA. Apr 2022
  Minisymposium: "New Developments in Gaussian Processes".
- Matérn Gaussian Fields on Graphs: Theory and Applications. Aug 2021
  Joint Statistical Meetings (Virtual).
  Topic-contributed Session: "Algorithms for Threat Detection".
- Graph-Based Methods for Bayesian Elliptic Inverse Problems on Manifold. Mar 2021
  SIAM Conference on Computational Science and Engineering (Virtual).
  Minisymposium: "Data-Driven Scientific Computing".
- Graph-Based Approximation of Matérn Gaussian Fields. Feb 2021
  University of Wisconsin-Madison Statistics Seminar (Virtual).
- Graph-Based Methods for Inverse Problems on Manifolds and Point Clouds. Jun 2020
  SIAM Conference on Mathematics of Data Science (Virtual).
  Minisymposium: "Bridging Data Assimilation with Data-driven analysis".
- Local Regularization of Noisy Point Clouds. Jun 2019
  GTDAML Graduate Student Conference, The Ohio State University.

Teaching Experience

- Princeton University Course Instructor
  - MAT321/APC321 Numerical Analysis and Scientific Computing Fall 2023
- University of Chicago Guest Lecturer
  - CAAM 31440: Applied Analysis. Fall 2021
- University of Chicago Teaching Assistant
  - CAAM 31440: Applied Analysis. Fall 2021
  - CAAM 31210: Applied Functional Analysis. Fall 2018, 2019, Winter 2021, 2022
  - STAT 24300: Numerical Linear Algebra. Fall 2020
  - CAAM 31511: Monte Carlo Simulation. Spring 2020, 2022
  - STAT 31700: Introduction to Probability Models. Winter 2020
  - CAAM 31450: Applied Partial Differential Equations. Spring 2019
  - CAAM 31220: Partial Differential Equations. Winter 2019

Professional Services

- Conference Session Organizer
  SIAM Conference on Mathematics of Data Science, Atlanta GA. Oct 2024
  Minisymposium: "Recent Advances in Gaussian Process and Kernel Methods" (with Daniel Sanz-Alonso).
- Journal Referee
  Journal of the American Statistical Association (twice); Journal of the Royal Statistical Society Series B; Statistics and Computing; Signal Processing
- Conference Reviewer
  NeurIPS (2023,2024); ICML (2024); ICLR (2024,2025); AAAI (2025); AISTATS (2025)

Skills

Matlab, Python, R.