# Ruiyi Yang

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| CONTACT INFORMATION | Fine Hall 209, Washington Road | E-mail: ry8311@princeton.edu |
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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. 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

2. Amit Singer and Ruiyi Yang. Alignment of density maps in Wasserstein distance. *Biological Imaging*, 4:e5, 2024

3. 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

4. Bryon Aragam and Ruiyi Yang. Uniform consistency in nonparametric mixture models. *The Annals of Statistics*, 51(1):362–390, 2023

5. 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

6. 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

7. 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

8. Daniel Sanz-Alonso and Ruiyi Yang. The SPDE approach to Matérn fields: Graph representations. *Statistical Science*, 37(4):519–540, 2022

9. 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

10. 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

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| 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.

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| 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.