# Ziang Niu

Statistics Ph.D. Student

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## Education

**University of Pennsylvania** (Philadelphia, PA), Ph.D. in Statistics, 2028 (expected).
Research Advisor: Eugene Katsevich and Bhaswar B. Bhattacharya.

**University of Pennsylvania** (Philadelphia, PA), M.A. in Applied Mathematics, 2023.
Research Advisor: Eugene Katsevich and Bhaswar B. Bhattacharya.

**Renmin University of China** (Beijing, China), B.A. in Economic Statistics, 2021.
Thesis Advisor: Wei Li.

## Experience

### *Student academic research*

*Ph.D. student researcher*, University of Pennsylvania (2023–now).
I have been developing novel methodology for application-driven conditional independence and model calibration problems. See [6, 7]. Along the project [6], I have also been working on more classical topics including *saddlepoint approximation*. See [**?**].

*Master student researcher*, University of Pennsylvania (2021–2023).
I developed novel theory and methodology for (conditional) independence testing and high-dimensional inference problems. See [3, 4, 5].

*Undergraduate student researcher*, Renmin University of China, (2020–2021).
I designed, studied theoretically, and implemented a two-stage framework to conduct the causal inference for high-dimensional treatment allowing for unobserved confounding. See [2].

*Undergraduate student researcher*, University of College London, (2020–2021).
I proposed a novel method to boost the inference for intractable likelihood models with the Quasi-Monte Carlo method. See [1].

## Fellowship and Awards

- Conference on Monte Carlo Methods and Applications Student Travel Award (2025).
  Institute for Mathematical and Statistical Innovation, Chicago.
- Lawrence David Brown Best Student Paper Award (2024).
  Department of Statistics and Data Science at Wharton, UPenn.
- SIAM Annual Meeting Student Travel Award (2021).
  Society for Industrial and Applied Mathematics.
- Undergraduate Study Scholarship (2017-2019).
  Renmin University of China.

# Professional Service Activities

- *Reviewer*, AoAP, Bernoulli, EJS, JASA, JMLR, JRSS-A, NeurIPS.
- *Organizer*, ICSA-Canada Chapter Symposium (2024).
  I organized and chaired the session "Topic in Combinatorial Inference", which included inviting speakers, coordinating the conference schedule with the speakers and hosting the session.

# Presentations

## *Invited Seminar Presentations*

- *Assumption-lean weak limits and tests for two-stage adaptive experiments*
  International Seminar on Selective Inference, Jun. 3, 2025. [Slides]
- *Computationally efficient and statistically accurate conditional independence testing with spaCRT*
  International Seminar on Selective Inference, Nov. 4, 2024. [Slides]

## *Invited Conference Oral Presentations*

- *Discrepancy-based Inference for Intractable Generative Models using Quasi-Monte Carlo.*
  15th International Conference on Monte Carlo Methods and Applications (MCM), July. 28– Aug. 1, 2025, in Chicago, USA.

## *Contributed Conference Oral Presentations*

- *Detect model miscalibration via your nearest neighbor*
  Bernoulli-ims 11th World Congress in Probability and Statistics, Aug. 12-16, 2024, in Bochum, Germany. [Slides]
- *A reconciliation between finite-sample and asymptopia-based methods in conditional independence testing*
  Lawrence David Brown student workshop, Mar. 22, 2024, in Philadelphia, USA. [Slides]
  Joint Statistical Meeting, Aug. 5-10, 2023, in Toronto, Canada.
- *Inference for ATE using heterogeneity: generalized 2SLS and double machine learning perspectives*
  Statistical Society of Canada Annual Meeting, May 28-31, 2023, in Ottawa, Canada.
- *Discrepancy-based Inference for Intractable Generative Models using Quasi-Monte Carlo.*
  Lifting Inference with Kernel Embeddings, Jan. 10–14, 2022, online. [Video] [Slides]
- *Estimation and inference for high-dimensional nonparametric additive instrumental-variables regression.*
  Chinese R Conference, Nov. 20–21, 2021, in Beijing, China.
  ICSA-Canada Chapter Symposium, Jul. 8–10, 2022, in Banff, Canada. [Slides]

## *Conference Poster Presentations*

- *Discrepancy-based Inference for Intractable Generative Models using Quasi-Monte Carlo.*
  SIAM Annual Meeting, Jul. 19–23, 2021, online. [Poster]
  Paris AI Summer School, Jul. 5–9, 2021, online.

## Mentorship

- Vikram Balasubramanian
  Directed Reading Program, UPenn, Sep.–Dec., 2022.
- Alexandru Lopotenco
  Undergraduate Research in Probability and Statistics, UPenn, Jan.–May., 2022.
- Ryan Jeong
  Undergraduate Research in Probability and Statistics, UPenn, Jan.–May., 2022.

## Publications and Preprints

[1] **Z. Niu***, J. Meier*[1], and F-X. Briol. Discrepancy-based Inference for Intractable Generative Models using Quasi-Monte Carlo. **Electronic Journal of Statistics**, 2022. Available on arXiv.

[2] **Z. Niu**, Y. Gu, W. Li. Estimation and inference for high-dimensional nonparametric additive instrumental-variables regression. Major revision at **Electronic Journal of Statistics**, 2022+. Available on arXiv.

[3] S. Mukherjee, **Z. Niu**, S. Halder, B. B. Bhattacharya, G. Michailidis. High Dimensional Logistic Regression Under Network Dependence. To appear at **Journal of Machine Learning Research**, 2022+. Available on arXiv.

[4] **Z. Niu***, A. Chakraborty*, O. Dukes, and E. Katsevich. Reconciling model-X and doubly robust approaches to conditional independence testing. To appear at **Annals of Statistics**. Available on arXiv. [*Lawrence David Brown Best Student Paper Award at Wharton, 2024*]

[5] **Z. Niu**, B. B. Bhattacharya. Distribution-free joint independence testing and robust independent component analysis using optimal transport. Major revision at **Journal of the American Statistical Association**, 2022+. Available on arXiv.

[6] **Z. Niu**, J. Ray Choudhury, E. Katsevich. The conditional saddlepoint approximation for fast and accurate large-scale hypothesis testing. In submission, 2025+. Available on arXiv.

[7] A. Chatterjee*, **Z. Niu***, B. B. Bhattacharya. A kernel-based conditional two-sample test using nearest neighbors (With applications to calibration, regression curves and simulation-based inference). In submission, 2024. Available on arXiv.

[8] T. Barry, **Z. Niu**, E. Katsevich, X. Lin. The permuted score test for robust differential expression analysis. In submission, 2025. Available on arXiv.

[9] **Z. Niu**, Z. Ren. Assumption-lean weak limits and tests for two-stage adaptive experiments. In submission, 2025. Available on arXiv. [*Finalist for IISA Student Paper competition, 2025*]

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[1] * stands for equal contribution