Ruiqi (Rae) Yu

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EDUCATION

Princeton University, *Princeton, NJ* *Sept 2021 - May 2026 (Expected)*
***PhD Candidate in Operations Research and Financial Engineering (ORFE)*, GPA: 3.95/4.00**
- Core Courses: *Mathematical Statistics; Data Science; Optimization; Probability Theory; High Dimensional Probability; Stochastic Calculus; Algorithm; Computational Finance in C++; Deep Learning Theory*
- Honors: *DDSS Graduate Fellowship in Social Data Science (Spring 24)*
- *General exam passed in May,2023, with incidental MA degree.*

University of Toronto, *Toronto, Ontario, Canada* *Sept 2017 - Jun 2021*
***Honors Bachelor of Science in Mathematics*, GPA: 3.99/4.00**
- Courses: *Measure Theory; Functional Analysis; Topology; Graph Theory; Differential Equations; Probability; Financial Maths; Statistical Machine Learning*
- Honors: *Dean's List Scholar (18,19,20),The George Gray Falle Scholarships (18,19), Adel S Sedra Undergraduate Scholarship inMathematics (18), Coxeter Scholarship inMathematics (19,21), University of Toronto Scholar – Rogers (19), The Chancellor's Scholarships (20).*

Peking University, *Beijing, China* *July 2019 - August 2020*
Summer School
- Courses: *Python Programming; Stochastic Calculus and Its Applications in Quantitative Finance*

RESEARCH EXPERIENCE

PhD Research, Princeton ORFE, *Princeton, NJ* *June 2021 - Present*
Research in mathematical statistics and causal inference with Advisor Prof. Matias Cattaneo.

Strong Gaussian Approximation

*Preprint: Cattaneo, M. D, **Yu, R.** (2024). Strong Approximations for Empirical Processes Indexed by Lipschitz Functions. arXiv:2406.04191. Joint work with Prof. Matias D. Cattaneo (ORFE).*
- Improved the rate of coupling empirical processes by Gaussian process under Lipschitz and multiplicative conditions.
- Can be applied for validity of uniform confidence bands in non-parametric estimation problems.
- Implied weaker conditions on bandwidth for uniform confidence bands, for example in kernel regression problems.

Boundary Regression Discontinuity Design

(Upcoming) Joint work with Prof. Matias D. Cattaneo (Princeton ORFE) and Prof. Rocío Titiunik (Princeton Politics).
- Developed causal inference methods based on a boundary regression discontinuity design (RDD).
- Studied the uniform distributional properties of the Regression Discontinuity Design (RDD) estimators
- Provided a novel characterization of bias that is neglected by practitioners.
- Programmed R-package for the implementation of bandwidth selection and RDD estimation.

Network Interference under Dependent Treatments

(Upcoming) Joint work with Prof. Matias D. Cattaneo, Prof. Jianqing Fan and Yihan He (all from Princeton ORFE).
- Developed causal inference methods in presence of spillover via social network.
- Modeled dependent treatments via an Ising model from statistical physics.
- Developed adaptive inference strategy uniformly valid despite unknown degree of peer effects.

Undergraduate Research, University of Toronto, *Toronto, Ontario, Canada* *Sept 2019 - March 2021*
Research assistant for Professor Yosh Halberstam at University of Toronto, Department of Economics

Voice vs. Labor Market Outcome
- Estimated fundamental frequencies of audio clips via autocorrelation, Fourier transformation and a software Pratt.

Effect of Telecommunications Conglomerate on Election Outcome
- Wrote a replicable Stata project for data cleaning, merging and regression analysis.

TEACHING EXPERIENCE

PhD Teaching, Princeton ORFE, *Princeton, NJ* *June 2022 - Present*

- Teaching Assistant for Fundamentals of Statistics.

Undergraduate Teaching, University of Toronto, *Toronto, Ontario, Canada* *Sept 2019 - March 2021*

- Teaching Assistant for Linear Algebra, Calculus and Ordinary Differential Equations.

SKILLS

Programming Languages *Python, C++, R, Stata, Latex*

Spoken Languages *English, Chinese*