Xingyu Wang

Contact Information

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Research Interests

- Rare Event Analysis, Large Deviations and Metastability, Heavy Tails
- Machine Learning Theory
- Stochastic Simulation

Employment

University of Amsterdam, Amsterdam School of Economics — Amsterdam, NL

- Postdoc Researcher, Quantitative Economics — 2024 - 2026 (Expected)
  Hosts: Roger J.A. Laeven, Bert Zwart

Education

Northwestern University, McCormick School of Engineering — Evanston, IL, US

- Ph.D. in Industrial Engineering and Management Sciences — 2018 - 2024
  Advisor: Chang-Han Rhee
- M.S. in Analytics — 2016 - 2017

Peking University — Beijing, China

- B.S. in Psychology and Applied Mathematics — 2011 - 2016

Submitted and Working Papers

Strongly Efficient Rare-Event Simulation for Regularly Varying Lévy Processes with Infinite Activities [pdf]
Xingyu Wang, Chang-Han Rhee
Major Revision at *Mathematics of Operations Research*; `arXiv:2309.13820`

Large Deviations and Metastability Analysis for Heavy-Tailed Dynamical Systems [pdf]
Xingyu Wang, Chang-Han Rhee
Major Revisiont at *The Annals of Applied Probability*; `arXiv:2307.03479`
Second Place, George Nicholson Student Paper Competition, 2023

Tail Asymptotics of Cluster Sizes in Multivariate Heavy-Tailed Hawkes Processes [pdf]
Jose Blanchet, Roger J. A. Laeven, Xingyu Wang, Bert Zwart
Submitted to *The Annals of Applied Probability*; `arXiv:2503.01004`

Sample Path Large Deviations for Multivariate Heavy-Tailed Hawkes Processes and Related Lévy Processes [pdf]
Jose Blanchet, Roger J. A. Laeven, Xingyu Wang, Bert Zwart
Submitted to *Bernoulli*; `arXiv:2503.01004`

Multi-agent Multi-armed Bandit with Fully Heavy-tailed Dynamics [pdf]
Xingyu Wang, Mengfan Xu; `arXiv:2501.19239`

Selected Publications

Importance Sampling Strategy for Heavy-Tailed Systems with Catastrophe Principle [pdf]
Xingyu Wang, Chang-Han Rhee
Proceedings of Winter Simulation Conference (WSC), 2023

Eliminating Sharp Minima from SGD with Truncated Heavy-Tailed Noises [pdf]

Xingyu Wang, Sewoong Oh, Chang-Han Rhee
Proceedings of International Conference on Learning Representations (ICLR), 2022
***Nemhauser Prize for Best Student Paper**, 2022*

Efficient Rare-Event Simulation for Multiple Jump Events in Regularly Varying Lévy Processes with Infinite Activities [pdf]

Xingyu Wang, Chang-Han Rhee
Proceedings of Winter Simulation Conference (WSC), 2020

Competitive Multi-Agent Inverse Reinforcement Learning with Sub-Optimal Demonstrations [pdf]

Xingyu Wang, Diego Klabjan
Proceedings of International Conference on Machine Learning (ICML), 2018

Honors and Awards

- **Second Place, George Nicholson Student Paper Competition**, INFORMS 2023
- **Terminal Year Fellowship**, Northwestern University 2023
- **Nemhauser Prize for Best Student Paper**, Department of Industrial Engineering and Management Sciences, Northwestern University 2022
- **Benjamin A. Sachs Graduate Fellowship**, Northwestern University 2022
- **Arthur P. Hurter Award for Academic Excellence among First Year Graduate Students**, Department of Industrial Engineering and Management Sciences, Northwestern University 2019
- **Lee Wai Wang Scholarship**, Department of Psychology, Peking University 2015
- **National Scholarship for Undergraduates**, Department of Psychology, Peking University 2013

Invited Presentations

Large Deviations for Multivariate Heavy-Tailed Hawkes Processes

- Stochastic Seminars at Korteweg-de Vries Institute for Mathematics, Amsterdam, NL Feb, 2025

Sharp Characterization and Control of Global Dynamics of SGDs with Heavy Tails

- Applied Probability Society Conference 2025 July, 2025
- Bayes Comp 2025, Singapore Jun, 2025
- Data-Driven Queueing Challenges Conference, Eindhoven, NL Nov, 2024
- INI Satellite Programme on Heavy Tails in Machine Learning, London, UK Apr, 2024
- SNAPP Seminar, Lightning Talk Session, Virtual [slides] [video] Dec, 2023

Importance Sampling Strategy for Heavy-Tailed Systems with Catastrophe Principle

- Winter Simulation Conference (Advanced Tutorial), San Antonio, TX Dec, 2023

Large Deviation and Metastability Analysis for Heavy-Tailed Dynamical Systems

- Neurips 2023, Heavy Tails in ML Workshop (Poster), New Orleans, LA Dec, 2023
- INFORMS Annual Meeting, Phoenix, AZ Oct, 2023
- Cornell ORIE Young Researchers Workshop, Ithaca, NY Oct, 2023

Eliminating Sharp Minima from SGD with Truncated Heavy-Tailed Noises [slides]

- INFORMS Annual Meeting, Phoenix, AZ Oct, 2023

- Applied Probability Society Conference 2023, Nancy, France — Jun, 2023
- INFORMS Annual Meeting, Indianapolis, IN — Oct, 2022
- International Conference on Learning Representations (2022), Virtual — Apr, 2022
- DeepMath (2021), Virtual — Nov, 2021

Efficient Rare-Event Simulation for Multiple Jump Events in Regularly Varying Lévy Processes with Infinite Activities [slides]

- Winter Simulation Conference, Virtual — Dec, 2020
- INFORMS Annual Meeting, Virtual — Nov, 2020

TEACHING EXPERIENCE

Instructor

- IEMS Bootcamp (Probability) for PhD Students — 2022 Fall, 2023 Fall

Teaching Assistant

- UvA Introduction to Data Science — 2025
- UvA Non-Life Insurance: Statistical Techniques and Data Analytics — 2024
- NU IEMS 317 Discrete Event Systems Simulation — 2022 Winter; 2021 Winter
- NU IEMS 315 Stochastic Models — 2021 Spring, Fall; 2020 Spring, Fall

Course Grader

- NU OPNS 450 Decision Models & Prescriptive Analytics — 2022 Winter
- NU IEMS 435 Stochastic Simulation — 2020 Winter

SERVICES

- Referee: *Operations Research, Management Science, INFORMS Journal on Computing, ICML (2025), Winter Simulation Conference (2023, 2025), Communications Physics*
- Volunteer: *NU MORE-REACH panel (2024)*
- Webmaster: *Stochastic Networks, Applied Probability, and Performance (SNAPP) seminar (2023 - 2024)*
- Mentor: *1st-year mentorship program at NU INFORMS Student Chapter (2020, 2021)*

INDUSTRIAL EXPERIENCE

Graduate Student Analytics Consultant, Chicago Park District — Chicago, IL
Oct 2016 - May 2017

Data Analyst Intern, 17zuoye (aka Homework Together, K12 education platform) — Beijing, China
Aug - Dec 2015