

# Shengyi He

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Columbia University  
Industrial Engineering and Operations Research  
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## RESEARCH INTERESTS

I work in the intersection of statistics and machine learning with operations research. My PhD research topics include error reduction and uncertainty quantification in Monte Carlo methods and stochastic optimization.

## EDUCATION

Columbia University  
*Ph.D. Operations Research*  
*M.S. Operations Research*  
Overall GPA: 4.24/4.33

New York, NY  
September 2019 - April 2024  
September 2019 - June 2020

Peking University  
*B.S. Statistics*  
Overall GPA: 3.8/4.0

Beijing, China  
September 2015 - June 2019

## WORK EXPERIENCE

Citadel Securities  
*Quantitative Researcher*  
*Quantitative Research Intern*

Miami, FL  
July 2024 -  
June - August 2023

Amazon  
*Research Scientist Intern*

Bellevue, WA  
May - August 2022

## AWARDS AND FELLOWSHIPS

- INFORMS I-SIM PhD Colloquium Award, Winter Simulation Conference (WSC) 2021
- Presidential Fellowship, Columbia University, 2019
- Outstanding Graduate, Peking University, 2019
- Yizheng Scholarship, Peking University, 2018
- Founder Scholarship, Peking University, 2017
- First Prize in Mathematics Competition of Chinese College Students, 2017

- May Fourth Scholarship, Peking University, 2016

## PUBLICATIONS

### Journal Papers

- **Shengyi He**, Michael Fu, Guangxin Jiang, and Henry Lam. Adaptive importance sampling for efficient stochastic root finding and quantile estimation, *Articles in Advance, Operations Research*, 2023.
- **Shengyi He** and Henry Lam. Higher-order coverage errors of batching methods via Edgeworth expansions on  $t$ -statistics, *to appear in Annals of Statistics*.
- Mansur Arief, Yuanlu Bai, Wenhao Ding, **Shengyi He**, Zhiyuan Huang, Henry Lam, and Ding Zhao. Certifiable deep importance sampling for rare-event simulation of black-box systems, *under minor revision in Operations Research*.
- **Shengyi He** and Henry Lam. Higher-order expansion and Bartlett correctability of distributionally robust optimization, *under revision in Mathematics of Operations Research*.
- **Shengyi He** and Henry Lam. Robust sensitivity analysis to assess input distributional uncertainty: Asymptotic approximations and computations, *in preparation*.
- **Shengyi He** and Henry Lam. Achieving higher-order coverage accuracy with computationally cheaper iterated bootstraps, *in preparation*.
- **Shengyi He** and Henry Lam. Statistical optimality in low-computation uncertainty quantification, *in preparation*.

### Conference Proceedings

- Mansur Arief, Zhiyuan Huang, Guru Koushik Senthil Kumar, Yuanlu Bai, **Shengyi He**, Wenhao Ding, Henry Lam, and Ding Zhao. Deep Probabilistic Accelerated Evaluation: A robust certifiable rare-event simulation methodology for black-box safety-critical systems, *Proceedings of The 24th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2021.
- **Shengyi He** and Henry Lam. Higher-order coverage error analysis for batching and sectioning, *Proceedings of the Winter Simulation Conference (WSC)*, 2021.  
[WSC 2021 INFORMS I-SIM PhD Colloquium Award]
- **Shengyi He** and Henry Lam. Batching on biased estimators, *Proceedings of the Winter Simulation Conference (WSC)*, 2022.
- Yuanlu Bai, **Shengyi He**, Henry Lam, Guangxin Jiang, and Michael Fu. Importance sampling for rare-event gradient estimation, *Proceedings of the Winter Simulation Conference (WSC)*, 2022.
- **Shengyi He** and Henry Lam. Optimal batching under computation budget, *Proceedings of the Winter Simulation Conference (WSC)*, 2023.

## TALKS

- INFORMS Annual Meeting, Oct 2023  
Winter Simulation Conference (WSC), Dec 2023  
Title: Optimal batching under computational budget
- Winter Simulation Conference (WSC), Dec 2022  
Title: Batching on biased estimators
- Winter Simulation Conference (WSC), Dec 2021  
Title: Higher-order coverage error analysis for batching and sectioning
- Canadian Operational Research Society (CORS), Jun 2021  
SIAM Conference on Uncertainty Quantification, April 2022  
Cornell Young Researchers Workshop (poster), Oct 2022  
SIAM Conference on Optimization, June 2023  
Title: Adaptive importance sampling for efficient stochastic root finding and quantile estimation
- INFORMS Annual Meeting, Nov 2020  
Title: Sequential importance sampling in stochastic root-finding and optimization
- PhD seminar, Oct 2020  
New England Statistics Symposium (NESS), May 2022  
International Conference on Continuous Optimization (ICCOPT), July 2022  
INFORMS Annual Meeting, Oct 2022  
Title: Higher-order expansion and Bartlett correctability of distributionally robust optimization

## RESEARCH PROJECTS

- The asymptotic behavior of maximum likelihood estimator for partially observable diffusion processes, advisor: Chenxu Li, Peking University, 2017-2019
- Deep learning methods for Airbnb room quality analysis, advisor: David Simchi-Levi, MIT, 2018

## TEACHING EXPERIENCE

Teaching assistant at Columbia University for

- *IEOR E4630: Asset Allocation*, Spring 2024
- *IEOR E4004: Optimization Models and Methods*, Spring 2023
- *IEOR 6711: Stochastic Modeling I (a PhD core course)*, Fall 2020, Fall 2021, Fall 2023
- *IEOR E4725: Networks: Formation, Contagion, and Epidemics*, Spring 2021

## **SKILLS**

- Computer skills: Python, C/C++, MATLAB, SQL, R
- Language: Mandarin (native), English (advanced)