

Chang-Han Rhee

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RESEARCH INTERESTS	Applied Probability, Simulation and Statistical Inference for Stochastic Processes, Rare-Event Analysis, Sensitivity Analysis, Experimental Design, Machine Learning.	
ACADEMIC POSITIONS	Northwestern University , Evanston, IL, USA <i>Industrial Engineering and Management Sciences</i> Assistant Professor	2018–Present
	Centrum Wiskunde & Informatica , Amsterdam, Netherlands <i>Stochastics Group</i> Postdoctoral Researcher	2015–2018
	Georgia Institute of Technology , Atlanta, GA, USA <i>Industrial & Systems Engineering and Biomedical Engineering</i> Postdoctoral Fellow	2013–2015
EDUCATION	Stanford University , Stanford, CA, USA <i>Ph.D. in Computational and Mathematical Engineering</i>	2013
	Stanford University , Stanford, CA, USA <i>M.S. in Computational and Mathematical Engineering</i> ¹	2008
	Seoul National University , Seoul, Korea <i>B.S. in Mathematics and B.S. in Computer Science</i>	2006
HONORS AND AWARDS	<ul style="list-style-type: none">• NSF CAREER Award, 2022• INFORMS Simulation Society Outstanding Publication Award, 2016• Finalist, INFORMS George Nicholson Student Paper Competition, 2013• Best Student Paper Award (MS/OR focused), Winter Simulation Conference, 2012• Samsung Fellowship, 2008–2012• Seoul National University Merit Scholarship, 2005–2006	
JOURNAL PAPERS	<p>[1] “Lyapunov conditions for differentiability of Markov chain expectations: the absolutely continuous case,” with P. W. Glynn. arXiv:1707.03870. <i>Mathematics of Operations Research</i>. Accepted with Minor Revision.</p> <p>[2] “Sample-path large deviations for Lévy processes and random walks with Weibull increments,” with M. Bazarbakhsh, J. Blanchet, and B. Zwart. <i>Annals of Applied Probability</i>. 30(6): 2695–2739, 2020.</p> <p>[3] “Sample-path large deviations for Lévy processes and random walks with regularly varying increments,” with J. Blanchet and B. Zwart. <i>Annals of Probability</i>. 47(6): 3551–3605, 2019.</p>	

¹Officially granted in 2013

- [4] “Efficient rare-event simulation for multiple jump events in regularly varying random walks and compound Poisson processes,” with B. Chen, J. Blanchet, and B. Zwart. *Mathematics of Operations Research*. 44(3): 919–942, 2019.
- [5] “Queue length asymptotics for the multiple server queue with heavy-tailed Weibull service times,” with M. Bazhba, J. Blanchet, and B. Zwart. *Queueing Systems*. 93(3–4): 195–226, 2019
- [6] “Importance sampling of heavy-tailed iterated random functions,” with B. Chen and B. Zwart. *Advances in Applied Probability*. 50(3): 805–832, 2018.
- [7] “Unbiased estimation with square root convergence for SDE models,” with P. W. Glynn. *Operations Research*, 63(5): 1026–1043, 2015. **2016 INFORMS Simulation Society Outstanding Simulation Publication Award**. The preprint of this paper was also recognized as a **Finalist in 2013 George Nicholson Student Paper Competition**.
- [8] “Exact estimation for Markov chain equilibrium expectations,” with P. W. Glynn. *Journal of Applied Probability (Special Jubilee Issue)*, 51A: 377–389, 2014.

SUBMITTED
PAPERS

- [9] “Sample-path large deviations for unbounded additive functionals of the reflected random walk,” with M. Bazhba, J. Blanchet, B. Zwart. [arXiv:2003.14381](https://arxiv.org/abs/2003.14381). Under 2nd round review for *Mathematics of Operations Research*.
- [10] “Large deviations for stochastic fluid networks with Weibullian tails,” with M. Bazhba and B. Zwart. [arXiv:2202.12770](https://arxiv.org/abs/2202.12770). Submitted to the special issue of *Queueing Systems* in honor of Masakiyo Miyazawa.
- [11] “Space filling design for non-linear models,” with E. Zhou and P. Qiu. [arXiv:1710.11616](https://arxiv.org/abs/1710.11616). Under a minor revision for *Stochastic Systems*.

CONFERENCE
PROCEEDINGS

- [12] “Eliminating sharp minima from SGD with truncated heavy-tailed noise,” with X. Wang and S. Oh. *International Conference on Learning Representations*, 2022.
- [13] “Rare-event simulation for multiple jump events in heavy-tailed Lévy processes with infinite activities,” with X. Wang. *Proceedings of the 2020 Winter Simulation Conference*, 2020.
- [14] “An iterative algorithm for sampling from manifolds,” with E. Zhou and P. Qiu. *Proceedings of the 2014 Winter Simulation Conference*, 2014.
- [15] “A new approach to unbiased estimation for SDEs,” with P. W. Glynn. *Proceedings of the 2012 Winter Simulation Conference*, 2012. **Best MS/OR focused Student Paper**.

WORK
IN PROGRESS

- [16] “Large deviations and metastability for Lévy-driven stochastic differential equations and stochastic difference equations with heavy-tailed noise,” with X. Wang.
- [17] “Sample-path large deviations for a class of heavy-tailed Markov additive processes” with B. Chen and B. Zwart.
- [18] “Sample-path large deviations for Lévy processes and random walks with regularly varying increments in multiple dimensions,” with Z. Su.
- [19] “Strongly efficient rare-event simulation for multiple jump events in regularly varying Lévy processes with infinite activities,” with X. Wang.
- [20] “Rare-event simulation for electric power distribution networks with high variability,” with N. Vasmel and B. Zwart.

- [21] “Quasi-variational problems in heavy-tailed large deviations theory,” with B. Zwart and J. Blanchet.
- [22] “Lyapunov conditions for differentiability of Markov chain expectations: the contracting case,” with P. W. Glynn.

STUDENT
MENTORING

PhD Students:

- Bohan Chen (CWI Stochastics²): defended in Dec 2019; first position: Munich Re
- Mihail Bazhba (CWI Stochastics²): defended in May 2021; first position: Univ. Amsterdam
- Zhe Su (Northwestern IEMS): expected to defend in 2024
- Xingyu Wang (Northwestern IEMS): expected to defend in 2024
- Jeffrey Wang (Northwestern IEMS): expected to defend in 2025

MS Students:

- Jingyi Zhao (Northwestern ESAM): graduated in March 2020

SERVICES

Editorial Service:

- Associate Editor, *INFORMS Journal on Computing*, 2019–2022

Award Committee:

- 2022–2023 Applied Probability Society Best Student Paper Prize Committee
- 2019–2022 Winter Simulation Conference PhD Colloquium Committee
- 2021–2023 Winter Simulation Conference Diversity Award Committee
- 2020–2021 George Nicholson Prize Committee

Program Committee:

- 2022–2023 SNAPP Seminar Series Organizing Committee
- 2023 Applied Probability Society Conference (postponed due to COVID-19)
- 2019 Applied Probability Society Conference
- 2019 Monte Carlo Methods
- 2016, 2018, 2019 Winter Simulation Conference (Analysis and Methodology Track)
- 2017, 2018 International Conference on Machine Learning (Reviewer)

Referee:

Annals of Applied Probability, Operations Research, Mathematics of Operations Research, Management Science, Electronic Journal of Probability, Stochastic Systems, Bernoulli, Advances in Applied Probability, INFORMS Journal on Computing, IIE Transactions on Automatic Control, Journal of Simulation, Proceedings of the Winter Simulation Conference, Proceedings of the 2016 MCQMC, Journal of Nonlinear Science

INVITED TALKS
AND TUTORIALS

Tutorial: Mathematics for Simulation

- I-SIM Workshop Simulation Summer School Tutorial, State College, June 2021

Eliminating Sharp Local Minima from SGD

- ISE department, University of Washington, May 2022 (Scheduled)
- SNAPP Seminar Series, February 2022
- Math Colloquium, Seoul National University, September 2021
- I-SIM Workshop, State College, June 2021

Mathematics of Uncertainty and Decision Making

²co-supervised with Bert Zwart

- KSEA National Mathematics & Science Competition Award Ceremony, December 2020

Sample path LDP for heavy-tailed processes and efficient rare-event simulation

- Center for Science of Science & Innovation, Northwestern University, May 2021
- Center for Financial Mathematics and Actuarial Research, UCSF, April 2021
- Heavy Tails Workshop, Eindhoven, December 2019
- International Workshop on Stress Test and Risk Management, Paris, May 2019
- Applied Math Colloquium, Illinois Institute of Technology, March 2019
- RESIM 2018, Stockholm, August 2018
- ISysE department, KAIST, Daejeon, August 2018
- Stochastics Colloquium, Eindhoven University of Technology, May 2018
- IEOR department, University of California at Berkeley, March 2018
- ORIE, University of Texas at Austin, February 2018
- ISEM department, National University of Singapore, February 2018
- IEMS department, Northwestern University, February 2018
- Mark Kac Lecture, Utrecht, November 2017
- Extreme Value Analysis Conference, Delft, June 2017
- IBM Watson, September 2016
- Lévy 2016 Summer School, July 2016

Perfect estimation with imperfect samplers

- ORIE department, Cornell University, April 2017
- Operations Research Seminar, Tinbergen Institute, December 2016
- Computational Statistics Seminar, Oxford University, November 2016
- Retrospective Monte Carlo Workshop, University of Warwick, July 2016
- Applied Mathematics Department, Ecole Polytechnique, Paris, June 2016
- OR department, Naval Postgraduate School, August 2015
- IE department, Seoul National University, December 2014
- IME department, Pohang University of Science and Technology, December 2014
- SME department, Sungkyunkwan University, December 2014
- Applied Probability Seminar, Georgia Tech, September 2014
- ISE department, Virginia Tech, March 2014
- ISysE department, KAIST, December 2013
- ICME Colloquium, Stanford University, February 2013

Sensitivity analysis for Markov chains

- Queueing Colloquium, Centrum Wiskunde & Informatica, May 2016
- SIAM Seminars on Current Research in Engineering & Applied Mathematics, Stanford, March 2012

Perfect estimation and response-surface-filling design

- ISysE department, Korean Advanced Institute of Science and Technology, March 2015
- IME department, Pohang University of Science and Technology, February 2015

- ISE department, University of Illinois at Urbana-Champaign, February 2015

TEACHING

Northwestern University, Evanston, IL, USA

Instructor

- IEMS 435: Stochastic Simulation (2018S, 2020W, 2021S, 2022S)
- IEMS 315: Stochastic Models (2019W, 2020S, 2020F, 2021S, 2022S)

Stanford University, Stanford, CA, USA

Instructor

- CME 001: Math Refresher Course (Summer 2011)

Teaching Assistant

- CME 100: Vector Calculus (Autumn 2012)
- MS&E 322: Stochastic Calculus and Control (Spring 2012)
- MS&E 121: Introduction to Stochastic Modeling (Winter 2007)