# Chang-Han Rhee


CONTACT

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RESEARCH INTERESTS

Applied Probability, Simulation and Statistical Inference for Stochastic Processes, Rare-Event Analysis, Sensitivity Analysis, Energy Systems, Experimental Design.

ACADEMIC POSITIONS

**Northwestern University**, Evanston, IL, USA — 2018–Present
*Industrial Engineering and Management Sciences*
Assistant Professor

**Centrum Wiskunde & Informatica**, Amsterdam, Netherlands — 2015–2018
*Stochastics Group*
Postdoctoral Researcher

**Georgia Institute of Technology**, Atlanta, GA, USA — 2013–2015
*Industrial & Systems Engineering and Biomedical Engineering*
Postdoctoral Fellow

EDUCATION

**Stanford University**, Stanford, CA, USA — 2013
*Ph.D. in Computational and Mathematical Engineering*

**Stanford University**, Stanford, CA, USA — 2008
*M.S. in Computational and Mathematical Engineering* [1]

**Seoul National University**, Seoul, Korea — 2006
*B.S. in Mathematics and B.S. in Computer Science*

AWARDS

- **INFORMS Simulation Society Outstanding Simulation Publication Award, 2016**
- Finalist, 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
- ACM SIGSIM Travel Award, 2012
- NSF Financial Support for WSC 2012

PUBLICATIONS

[1] "Sample-path large deviations for Lèvy processes and random walks with Weibull increments," with M. Bazhba, J. Blanchet, and B. Zwart. `arXiv:1710.04013`. Submitted to *Annals of Applied Probability*. (under revision for the second round review)

[2] "Sample-path large deviations for Lévy processes and random walks with regularly varying increments," with J. Blanchet and B. Zwart. `arXiv:1606.02795`. Submitted to *Annals of Probability*. (under second round review)

[3] "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. `arXiv:1706.03981`. To appear in *Mathematics of Operations Research*. (accepted)

[1] Officially granted in 2013

[4] "Importance sampling of heavy-tailed iterated random functions," with B. Chen and B. Zwart. `arXiv:1609.03182`. To appear in *Advances in Applied Probability*. (accepted)

[5] "Lyapunov conditions for differentiability of Markov chain expectations: the absolutely continuous case," with P. W. Glynn. `arXiv:1707.03870`.

[6] "Space filling design for non-linear models," with E. Zhou and P. Qiu. `arXiv:1710.11616`. Submitted to *Stochastic Systems*. (under revision for the second round review)

[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.

[9] "An iterative algorithm for sampling from manifolds," with E. Zhou and P. Qiu, *Proceedings of the 2014 Winter Simulation Conference*, 2014.

[10] "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.**

## Working Papers

[11] "Sample-path large deviations for Markov random walks with unbounded functionals," with M. Bazhba, J. Blanchet, B. Zwart

[12] "Tail asymptotics for multiple-server queues with Weibull service times," with M. Bazhba, J. Blanchet, B. Zwart

[13] "Sample-path large deviations for regularly varying Markov additive processes" with B. Chen and B. Zwart

[14] "On heavy-tailed simulation estimators," with B. Chen.

[15] "Rare event simulation for power grids," with N. Vasmel, and B. Zwart

[16] "Quasi-variational problems in heavy-tailed large deviations theory," with B. Zwart and J. Blanchet

[17] "Lyapunov conditions for differentiability of Markov chain expectations: the contracting case," with P. W. Glynn.

## Services

*Program Committee:*
- 2019 Applied Probability Society Conference
- 2019 Monte Carlo Methods
- 2017, 2018 International Conference on Machine Learning (Reviewer)
- 2016, 2018 Winter Simulation Conference (Analysis and Methodology Track)

*Referee:*
- Operations Research, Mathematics of Operations Research, Management Science, Bernoulli, Advances in Applied Probability, Stochastic Systems, INFORMS Journal on Computing, IIE Transactions, Journal of Simulation, Proceedings of the Winter Simulation Conference, Proceedings of the 2016 MCQMC

## Talks

*Sample path LDP for heavy-tailed processes*

- ISysE department, KAIST, August 2018
- Stochastic Seminar, 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 Univeristy, February 2018
- Mark Kac Lecture, Utrecht, November 2017
- Applied Probability Society Conference, Evanston, July 2017
- Extreme Value Analysis Conference, Delft, June 2017
- INFORMS Annual Meeting, Nashville, November 2016
- IBM Watson, September 2016
- Lévy 2016 Summer School, July 2016

*Efficient rare-event simulation for multiple jump events heavy-tailed processes*

- RESIM 2018, Stockholm, August 2018
- MCQMC 2018, Rennes, July 2018
- INFORMS Annual Meeting, Houston, October 2017

*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
- IMS-ISBA Joint Meeting MCMSki 2016, Lenzerheide, January 2016
- Scientific Meeting, Centrum Wiskunde & Informatica, November 2015
- 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, Korean Advanced Institute of Sceince and Technology, December 2013
- INFORMS Annual Meeting, Minneapolis, October 2013
- ICME Colloquium, Stanford University, February 2013
- Winter Simulation Conference, Berlin, December 2012

*Sensitivity analysis for Markov chains*

- Queueing Colloquium, Centrum Wiskunde & Informatica, May 2016
- INFORMS Annual Meeting, San Francisco, November 2014
- SIAM Seminars on Current Research in Engineering & Applied Mathematics, Stanford, March 2012

*An iterative algorithm for sampling from manifolds*

- Winter Simulation Conference, Savannah, December 2014

*Unbiased MLMC for rare event simulation of stochastic recursions*

- MCQMC 2016, Stanford University, August 2016

*Perfect estimation and response-surface-filling design*

- ISysE department, Korean Advanced Institute of Sceince 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 Experience

**Stanford University**, Stanford, CA, USA

*Instructor* Summer 2011

Taught math refresher course for the incoming students at Stanford Engineering School.
Duties: Developing course contents and giving lectures.

- CME 001: Math Refresher Course, Probability and Statistics Session

*Teaching Assistant* Autumn 2012, Spring 2012

Duties: Holding office hours, writing problem sets, final exams and their solutions, grading, and giving supplementary lectures and review sessions

- CME 100: Vector Calculus
- MS&E 322: Stochastic Calculus and Control

*Course Assistant* Winter 2007

Duties: Holding office hours, helping writing exams, and grading.

- MS&E 121: Introduction to Stochastic Modeling

## Professional Experience

**Gamevil Inc.**, Seoul, Korea 2003–2005

*Software Engineer (Alternative military service)*

- Worked on: Developing software libraries for mobile games. Developing mobile games. Administering online game server and user database.

**Wisefree Inc.**, Seoul, Korea 2002–2003

*Software Engineer (Alternative military service)*

- Worked on: Developing intranet system for LG Siltron and Korean national police.