

# PAUL HEAJOON JUNG

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## ACADEMIC PREPARATION

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<b>Cornell University</b> <i>Postdoctoral Fellowship, H.C. Wang Assistant Professor of Mathematics</i>	2003 - 2007
<b>University of California, Los Angeles</b> <i>Ph.D. in Mathematics</i>	June 2003
<b>Rice University</b> <i>B.A. in Mathematics and Economics</i>	May 1997

## PROFESSIONAL EXPERIENCE

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<b>Sam Houston State University, Huntsville</b> <i>Professor and Department Chair</i>	July 2022 - Present
<b>KAIST (Korea Advanced Institute of Science and Technology), Daejeon</b> <i>Professor</i>	2021 - 2022
<b>Georgia Institute of Technology, Atlanta</b> <i>Visiting Professor</i>	2020 - 2021
<b>KAIST (Korea Advanced Institute of Science and Technology), Daejeon</b> <i>Associate Professor (with tenure)</i>	2016 - 2021
<b>Université Paris-Dauphine, Paris</b> <i>Visiting Professor</i>	Summer 2019
<b>Monash University, Melbourne</b> <i>Robert Bartnik Visiting Fellow</i>	Spring 2017
<b>University of Alabama, Birmingham</b> <i>Associate Professor (with tenure)</i>	2015 - 2016
<b>University of Alabama, Birmingham</b> <i>Assistant Professor</i>	2011 - 2015
<b>Weierstrass Institute for Applied Analysis and Stochastics, Berlin</b> <i>Visiting Scholar</i>	Summer 2011
<b>Sogang University, Seoul</b> <i>Assistant Professor</i>	2009 - 2011
<b>Susquehanna International Group, Philadelphia</b> <i>Quantitative Analyst</i>	2007 - 2009

## GRANTS AND AWARDS

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NRF Science Research Center (1 of 12 members), Co-PI	9 billion KRW	2019 - 2026
NSF conference, Interacting Particle Systems, Co-PI	\$31,140	Spring 2019
Korean Mathematical Society Best Paper Award		2018
KAIST College of Natural Sciences Teaching Award		Fall 2017
NRF grant, Dependent Random Matrices, PI	500 million KRW	2017 - 2022
Robert Bartnik Fellowship, Monash University		Spring 2017
NSF conference, Dynamical Systems and Probability, Co-PI	\$45,400	Spring 2015
NSF-CBMS conference, Quantum Spin Systems, Co-PI	\$34,799	Summer 2014
NSA grant, Fractional Stable Fields, PI	\$39,218	2014 - 2016
Simons Foundation collaboration grant, PI	\$35,000	2013 - 2014
Sogang University Natural Sciences Best Paper Award		2011
Sogang University research grant	20 million KRW	2009 - 2011

## PUBLICATIONS

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### Journal articles (with hyperlinks)

1. “Infinite-width limit of feed-forward neural networks with dependent weights”  
Submitted ([arXiv:2106.08187](https://arxiv.org/abs/2106.08187))  
with Fadhel Ayed, François Caron, Hoil Lee, Juho Lee, and Hongseok Yang.
2. “ $\alpha$ -Stable convergence of heavy-tailed infinitely-wide neural networks”  
Submitted ([arXiv:2106.11064](https://arxiv.org/abs/2106.11064))  
with Hoil Lee, Jiho Lee, and Hongseok Yang
3. “At the edge of a one-dimensional jellium”  
[Bernoulli](#), 28 (3), 1784-1809, (August 2022) DOI: 10.3150/21-BEJ1397 ([arXiv:2012.04633](https://arxiv.org/abs/2012.04633))  
with Djali Chafaï and David García-Zelada.
4. “Large deviations in the quantum quasi-1D jellium”  
[Probability and Mathematical Physics](#) (to appear) ([arXiv:2009.14144](https://arxiv.org/abs/2009.14144))  
with Christian Hirsch and Sabine Jansen.
5. “The Life and Mathematical Legacy of Thomas M. Liggett”  
[Notices of the American Mathematical Society](#), (2021) 68(1):67-79  
with David Aldous, Pietro Caputo, Rick Durrett, Alexander Holroyd, and Amber Puha.
6. “Extreme eigenvalue statistics of  $m$ -dependent heavy-tailed matrices”  
[Annales de l'Institut Henri Poincaré](#), (2021), 57(4):2100-2127 ([arXiv:1910.08511](https://arxiv.org/abs/1910.08511))  
with Bojan Basrak, Yeonok Cho, and Johannes Heiny.
7. “Macroscopic and edge behavior of a planar jellium”  
[Journal of Mathematical Physics](#), (2020) 61(3):033304 ([arXiv:1909.00613](https://arxiv.org/abs/1909.00613))  
with Djali Chafaï and David García-Zelada.
8. “A note on invariance of the Cauchy and related distributions”  
[Statistics and Probability Letters](#), (2020) 158:108668 ([arXiv:1908.04006](https://arxiv.org/abs/1908.04006))  
with Wooyoung Chin and Greg Markowsky.
9. “Remarks on the recurrence and transience of non-backtracking random walks”  
[Journal of Combinatorics](#), (2020) 11(3):549-555 ([arXiv:1905.07863](https://arxiv.org/abs/1905.07863))  
with Greg Markowsky.
10. “Necessary and sufficient condition for  $\mathcal{M}_2$ -convergence to a Lévy process for billiards with cusps at flat points”

- [Stochastics and Dynamics, Vol. 21, No. 05, 2150024 \(2021\) \(arXiv:1902.08958\)](#)  
with Ian Melbourne, Françoise Pène, Paulo Varandas, and Hongkun Zhang.
11. “A Generalization of Hierarchical Exchangeability on Trees to Directed Acyclic Graphs”  
[Annales Henri Lebesgue, \(2021\) 4:325-368](#)  
with Jiho Lee, Sam Staton, and Hongseok Yang.  
Honorable mention poster, 12th International Conference on Bayesian Nonparametrics, Oxford.
  12. “On the speed and spectrum of mean-field random walks among random conductances”  
[Stochastic Processes and Their Applications, \(2020\) 130\(6\):3477-3498 \(arXiv:1702.04087\)](#)  
with Andrea Collecchio.
  13. “Convergence to stable Lévy motion for chaotic billiards with several cusps at flat points”  
[Nonlinearity, \(2019\) 33:807-839](#)  
with Françoise Pène and Hongkun Zhang.
  14. “Delocalization and Limiting Spectral Distribution of Erdős-Rényi Graphs with Constant Expected Degree”  
[Electronic Communications in Probability, \(2018\) 23\(92\):1-13](#)  
with Jaehun Lee.
  15. “Lévy-Khintchine random matrices and the Poisson weighted infinite skeleton tree”  
[Transactions of the AMS \(2018\), 370:641-668.](#)
  16. “Stable Laws for Chaotic Billiards with Cusps at Flat Points”  
[Annales Henri Poincaré, \(2018\) 19:3815-3853](#)  
with Hongkun Zhang.
  17. “Functional central limit theorem for negatively dependent heavy-tailed stationary infinitely divisible processes generated by conservative flows”  
[Annals of Probability \(2017\), 45:2087-2130](#)  
with Takashi Owada and Gennady Samorodnitsky.  
Korean Mathematical Society Best Paper Award, 2018
  18. “Hölder Continuity and Occupation-Time Formulas for fBm Self-Intersection Local Time and Its Derivative”  
[Journal of Theoretical Probability \(2015\) 28:299-312](#)  
with Greg Markowsky.
  19. “Target Frequency Analysis of Functional MRI Data.”  
[International Journal of Clinical Biostatistics and Biometrics \(2015\), 1:2](#)  
with Michael Froelich and Shannon Starr.
  20. “Wigner Crystallization in the Quantum 1D Jellium at All Densities.”  
[Communications in Mathematical Physics, \(2014\) 331:1133-1154](#)  
with Sabine Jansen.
  21. “On the Tanaka formula for the derivative of self-intersection local time of fBm”  
[Stochastic Processes and Their Applications \(2014\), 124:3846-3868](#)  
with Greg Markowsky.
  22. “Random-time Isotropic Fractional Stable Fields”  
[Journal of Theoretical Probability, \(2014\) 27:618-633.](#)
  23. “A Lindeberg-Feller theorem for stable laws”  
[Statistics and Probability Letters, \(2014\) 84:198-203 \(arXiv:1302.4011\)](#)  
with Clément Dombry.

24. “Random walks at random times: Convergence to iterated Lévy motion, fractional stable motions, and other self-similar processes”  
[Annals of Probability](#) (2013) 41:2682-2708  
 with Greg Markowsky.
25. “Indicator fractional stable motions”  
[Electronic Communications in Probability](#), (2011) 16:165-173.
26. “Symmetry Breaking in Quasi-1D Coulomb Systems”  
[Annales Henri Poincaré](#), (2010) 11(8):1453-1485  
 with Michael Aizenman and Sabine Jansen.
27. “On the Critical Behavior at the Lower Phase Transition of the Contact Process”  
[ALEA](#), (2007) 3:301-320  
 with Michael Aizenman.
28. “Two phase transitions for the contact process on small worlds”  
[Stochastic Processes and Their Applications](#), (2007) 117(12):1910-1929  
 with Rick Durrett.
29. “The Critical Value of the Contact Process with Added and Removed Edges”  
[Journal of Theoretical Probability](#), (2005) 18(4):949-955.
30. “The noisy voter-exclusion process”  
[Stochastic Processes and Their Applications](#), (2005) 115(12):1979-2005.
31. “Perturbations of the Symmetric Exclusion Process”  
[Markov Processes and Related Fields](#), (2004) 10(4):564:584. (arXiv:0309237)
32. “Extremal Reversible Measures for the Exclusion Process”  
[Journal of Statistical Physics](#), (2003) 112(1):165-191.
33. “The  $n$ -Extent of  $S^3(p, m)$ ”  
[Electronic Journal of Undergraduate Mathematics](#), (1995) 1:1–11  
 with Tucker McElroy and Jason Samuels.

### Miscellaneous publications

1. *Probability Theory Course Notes*  
[KAIST Course notes](#) (2019) 1-143.
2. *Invariant measures of the exclusion process and related processes.*  
 Ph.D. Thesis (2003) 1-112.

### EDITORIAL WORK

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*Celebratio Mathematica*, Volume in honor of Thomas Liggett. Mathematical Sciences Publishers, 2020 (Co-edited with A. Puha)

*Dynamical Systems, Ergodic Theory, and Probability: in Memory of Kolya Chernov.* Vol. 698. American Mathematical Society, 2017. (Co-edited with A. Blokh, L. Bunimovich, L. Oversteegen, Y. Sinai).

## PROGRAMMING/MACHINE LEARNING

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Programming languages:	Python, Matlab, R	
<a href="#">Deep Learning Specialization</a>	Coursera/DeepLearning.AI	2021
DeepLearning.AI Curriculum Architect program		2021

## ADVISED STUDENTS AND POSTDOCS

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### Current

Jaehoon Kang, KAIST Postdoc	Fall 2020 - Present
Hoil Lee, KAIST PhD	Fall 2018 - Present
Jaehun Lee, KAIST PhD	Summer 2017 - Present

### Past

Jongyun Hwang, KAIST Postdoc	Fall 2019 - Fall 2021
Wooyoung Chin, KAIST PhD	Spring 2017 - Fall 2021
Jiho Lee, KAIST PhD	Summer 2017 - Summer 2020
Yeonok Cho, UAB/KAIST PhD	Spring 2015 - Summer 2019
Jinwoong Kwak, KAIST Masters	Fall 2017 - Spring 2022
Robert Mann, UAB Masters	Spring 2015 - Spring 2016
Jarrod Hicks, UAB Masters	Spring 2013 - Spring 2016
Junggyo Jung, UAB Masters	Fall 2012 - Fall 2014
Mallick Hossain, UAB Masters	Fall 2011 - Spring 2012

## CONFERENCES ORGANIZED

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- Random Matrices and Universality Conference (IBS Daejeon), Postponed until 2022
- 2022 Annual KMS Probability Workshop (KAIST), February 2022
- 13th Annual KMS Probability Workshop (KAIST), November 2019
- Random Matrices and Related Topics Conference (KIAS Seoul), May 2019
- Conference on Interacting Particle Systems and Related Topics (IPAM UCLA), March 2019
- KAIST Summer Schools in Probability (KAIST), 2017 - 2018, 2021
- Gyeongju Workshop in Probability (Gyeongju), August 2018
- Dynamical Systems and Probability Conference in memory of N. Chernov (UAB), May 2015
- AMS Southeastern Sectional Meeting – Special Session (UAH), March 2015
- NSF-CBMS Conference, Quantum Spin Systems (UAB), June 2014

## CONFERENCE TALKS, SEMINARS, COLLOQUIA

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### *Exchangeable Random Structures*

Korea Institute of Advanced Studies Intensive Online Lecture Series Sep 2020

### *Generalizing Heirarchical Exchangeability to DAGs*

Sam Houston State University Colloquium Mar 4 2022  
Probability Victoria Seminar, Australia online Dec 16 2021  
U.S. Department of Defense Seminar Dec 6 2021  
Texas A&M University Probability Seminar Dec 1 2021  
University of British Columbia Probability Seminar Sep 2019  
Georgia Institute of Technology Probability Seminar Aug 2019  
China-Japan-Korea Probability Workshop, Beijing Institute of Technology May 2019  
Korean Mathematical Society 2019 Spring Meeting, Special Lecture Apr 2019  
UCLA Probability Seminar Mar 2019

### *Lévy-Khintchine Random Matrices*

Peking University Probability Seminar May 2019  
German and Korean Mathematical Societies Joint Meeting Oct 2018  
Random Matrices and Their Applications, Kyoto University May 2018  
Pohang University of Science and Technology Colloquium Dec 2017  
Korea Institute for Advanced Studies Analysis Seminar Aug 2017  
Joint Fudan-KAIST Math Department Workshop Oct 2016  
Western States Mathematical Physics Meeting Feb 2016  
University of Chicago Probability Seminar May 2015  
Cincinnati Symposium on Probability Theory Sep 2014  
7th International Conference on Stochastic Analysis and Applications Aug 2014  
AMS Sectional Meeting, Knoxville Mar 2014  
Monash University Colloquium Dec 2013

### *Symmetry Breaking in Coulomb Systems*

Seoul National University Colloquium Mar 25 2021  
Korea Institute of Advanced Studies Analysis Seminar Nov 2018  
Texas A&M Probability Seminar Feb 2018  
Monash University Colloquium May 2017  
KMS Probability Workshop Sep 2016  
University of Virginia Mathematical Physics Seminar Apr 2013  
UC Irvine Mathematical Physics Seminar Sep 2012  
NSF-CBMS, University of Alabama Huntsville Jun 2012  
Yonsei University Seminar Jun 2010  
Seoul National University Colloquium Apr 2010  
University of Central Florida Probability Seminar Feb 2010  
Joint Mathematics Meetings, Contributed Session Jan 2010

### *Stable laws in Chaotic Billiards with Cusps*

KMS Probability Workshop Sep 2018  
International Conference on Nonequilibrium Dynamical Systems, SUSTC Aug 2016  
Seoul National University Seminar Nov 2016  
KAIST Colloquium Dec 2016

*Heavy-tailed Physical Models*

Georgia Tech Seminar	Mar 16 2022
University of South Florida Colloquium	Feb 2016
University of Houston Seminar	Jan 2016
Rice University Mathematics Brown-bag Seminar	Jan 2016
KAIST Colloquium	Jan 2016
University of Central Florida Colloquium	Nov 2015

*Random Walks at Random Times*

University of Central Florida Probability Seminar	Nov 2014
University of Tennessee Knoxville Probability seminar	Mar 2013
Cornell University Probability Seminar	Sep 2012
AMS Sectional Meeting, Rochester	Sep 2012
Michigan State University Probability Seminar	Sep 2012
University of Alabama Huntsville Colloquium	Apr 2012
Auburn University Colloquium	Apr 2012
University of Alabama Joint Meeting	Nov 2011
Weierstrass Institute	Jul 2011

*Derivative of Self-intersection Local Time of  $fBm$*

NSF-CBMS, Michigan State University	Jun 2013
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*Fractional Stable Motions*

Berlin-Leipzig Probability Seminar	Jul 2011
Ajou University Colloquium	May 2011
KAIST Analysis Seminar	Apr 2011
Seoul National University Probability Seminar	Mar 2011
UCLA Probability Seminar	Feb 2011
Pepperdine University Colloquium	Jan 2011
University of Alabama Birmingham Colloquium	Jan 2011
KMS Probability Workshop	Nov 2010

*On the Critical Behavior of the Contact Process*

UCLA Probability Seminar	Oct 2009
Sogang University Colloquium	Apr 2009
Arizona State University Colloquium	Jan 2009
UC Berkeley Probability Seminar	Feb 2006
Stanford Probability Seminar	Jan 2006

*Perturbations of the Symmetric Exclusion Process*

NYU Courant Institute Probability Seminar	Apr 2005
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*The Contact Process on Small Worlds*

University of Delaware Probability Seminar	Mar 2005
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*Adding Edges to the Contact Process*

University of Rochester Probability Seminar	Nov 2004
Cornell University Probability Seminar	Oct 2004

*Invariant Measures of the Exclusion Process*

Cornell University Probability Seminar	Apr 2003
UCLA Probability Seminar	Oct 2002