

Jinsu Kim

- CONTACT INFORMATION** 440N Rowland Hall, Department of Mathematics,
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- RESEARCH INTERESTS** Probability, Reaction networks, Mathematical systems biology, System biology, Epigenetic dynamics, Markov processes, Mixing times of Markov models.
- EMPLOYMENT** **University of California, Irvine**
July 2020–present, Postdoctoral fellow at the NSF-Simons Center for Multiscale Cell Fate Research.
August 2018– present, Postdoctoral scholar at Department of Mathematics.
• Mentor : German Enciso
- EDUCATION** **University of Wisconsin-Madison**
2012–2018, Ph.D., Mathematics.
• Thesis Topic : *Stochastically modeled reaction networks: positive recurrence and mixing times*
• Advisor: David F. Anderson
Seoul National University, Republic of Korea.
2005–2012, B.S., Mathematics (*military service* 2007–2009)
- PREPRINTS**
1. David F. Anderson, Daniele Cappelletti, Wai-Tong (Louis) Fan, and Jinsu Kim. *Mixing times for stochastically modeled reaction networks*, in preparation.
 2. Jinsu Kim*, Katherine Sheu*, Quen Cheng, Alexander Hoffmann, and German Enciso. *Stochastic models of nucleosome dynamics reveal regulatory rules of stimulus-induced epigenome remodeling*, submitted, 2021.
- PUBLICATIONS**
1. German Enciso and Jinsu Kim, *Accuracy of Multiscale Reduction for Stochastic Reaction Systems*, accepted to Multiscale Modeling and Simulation, 2021. <https://arxiv.org/abs/1909.11916>.
 2. Hyuckpyo Hong*, Jinsu Kim*, M Ali Al-Radhawi, Eduardo Sontag and Jae Kyoung Kim, *Derivation of stationary distributions of biochemical reaction networks via structure transformation*, accepted to Communications Biology, 2021. <https://www.biorxiv.org/content/10.1101/2021.03.23.436681v1>
 3. German Enciso, Radek Erban and Jinsu Kim, *Identifiability of Stochastically Modeled Reaction Networks*, European Journal of Applied Mathematics, 1-23, 2021. <https://doi.org/10.1017/S0956792520000492>
<https://arxiv.org/abs/2006.02272>
 4. Jinsu Kim, Jason K. Dark, German Enciso, and Suzanne S. Sindi. *Slack Reactants: A State-Space Truncation Framework to Estimate Quantitative Behavior of the Chemical Master Equation*, The Journal of Chemical Physics, 153(054117), 2020. <https://doi.org/10.1063/5.0013457>
 5. Enrico Bibbona, Jinsu Kim and Carsten Wiuf, *Stationary distributions of systems with Discreteness Induced Transitions*, Journal of Royal Society Interface, 17:20200243, 2020. <https://doi.org/10.1098/rsif.2020.0243>

6. Jinsu Kim and German Enciso, *Absolutely Robust Controllers for Stochastic Chemical Reaction Networks*, Journal of Royal Society Interface, 17: 20200031, 2020.
<https://doi.org/10.1098/rsif.2020.0031>.
7. David F. Anderson, Daniele Cappelletti, Jinsu Kim and Tung Nguyen *Tier structure of strongly endotactic reaction networks and applications to stochastic models*, Stochastic Processes and their Applications, 130, 7218-7259, 2020..
<https://doi.org/10.1016/j.spa.2020.07.012>
8. David F. Anderson, Daniele Cappelletti and Jinsu Kim, *Stochastically modeled weakly reversible reaction networks with a single linkage class*, Journal of Applied Probability, 57(3):792–810, 2020. <https://dx.doi.org/10.1017/jpr.2020.28>
9. German Enciso and Jinsu Kim, *Embracing Noise in Chemical Reaction Networks*, J. Bull Math Biol, 81, 1261–1267, 2019.
<https://doi.org/10.1007/s11538-019-00575-3>
10. David F. Anderson and Jinsu Kim, *Some network conditions for positive recurrence of stochastically modeled reaction networks*, SIAM J. Appl. Math., 78(5), 2692–2713., 2018.
<https://doi.org/10.1137/17M1161427>

AWARDS

Research Award

- Best poster, the NSF-Simon Center for Multiscale Cell Fate 2020 annual meeting.

Grant

- Interdisciplinary Opportunity Award program at the NSF-Simon Center for Multiscale Cell Fate. Nov 2018 – Oct 2020
(Co-PI: Katherine Sheu at UCLA) \$10,000

Teaching award

- Nominated for the Most Promising Future Faculty Award, January 2020
University of California, Irvine.
- Teaching Assistant Award, Department of Mathematics, Spring 2013
University of Wisconsin-Madison.
- Honored Instructor Award, Division of University Housing, November 2012
University of Wisconsin-Madison.

Travel Awards

- Research visit (supported by Louis Fan), Indiana University. February 2020
- Conference Presentation Funds of University of Wisconsin-Madison Dec 2017
- 2017 annual meeting of Society for Mathematical Biology July 2017
- 2017 annual meeting of SIAM July 2017
- MSRI summer program January 2011
Seminaire de Mathematiques Superieures 2016: Dynamics of Biological Systems

Scholarship

- Merit-based scholarship, Lotte scholarship foundation 2009–2011

TALKS

- IBS Biomedical Mathematics Group Seminar, IBS Korea. April 2021
- AMS Postdoc Talk - Mathematics & Biology, April 2021
University of California, Irvine.
- CRM-ISM Probability/Applied Math Seminar, Online seminar. April 2021
- Mathematics of Reaction Networks, Online seminar. January 2021

- Applied Math Seminar, University of California, Santa Cruz. January 2021
- 2020 Korea Mathematical Society Fall meeting, Virtual workshop October 2020
- Probability seminar, University of Illinois Urbana-Champaign, October 2020
- 2020 Society for Mathematical Biology annual meeting, August 2020
Virtual workshop.
- 2020 Korea Mathematical Society Spring meeting, Virtual workshop July 2020
- Early Career Researcher Symposium, May 2020
Center for Multiscale Cell Fate Research, University of California, Irvine.
- Mathematical and Computational Methods in Biology, MBI. May 2020
- Probability seminar, Indiana University Bloomington. February 2020
- Mathbio seminar, University of California, Merced. December 2019
- AMS sectional meeting, University of California, Riverside. November 2019
- The 2nd Annual Symposium on Multiscale Cell Fate, October 2019
University of California, Irvine.
- PDE/Applied math seminar, University of California, Riverside. October 2019
- Probability seminar, Indiana University Bloomington. September 2019
- AMS sectional meeting, University of Wisconsin, Madison September 2019
- 2019 Society for Mathematical Biology annual meeting, July 2019
Montréal, Canada.
- Chemical reaction network workshop, DISMA Politecnico di Torino, July 2019
Turin, Italy.
- Mathematical biology seminar, Korea Advanced Institute of Science May 2019
and Technology (KAIST).
- Probability seminar, Tulane University. March 2019
- Biophysics and Systems Biology Seminar, March 2019
University of California, Irvine
- Early-Career Research Symposium 2019, NSF-Simon Center March 2019
for Multiscale Cell Fate, University of California, Irvine
- Analysis seminar, Korean Institute for Advanced Study (KIAS). December 2018
- Probability seminar, University of California, Irvine December 2018
- SIAM LS 2018 Annual Meeting, Minnesota, USA. August 2018
- Recent trends in continuous and discrete probability at Georgia tech. March 2018
- Probability seminar, University of Washington. January 2018
- Joint Mathematics Meeting 2018. January 2018
- Applied mathematics seminar, December 2017
Pohang University of Science and Technology.
- Probability seminar, University of Wisconsin-Milwaukee October 2017
- 2017 annual meeting of Society of Mathematical Biology July 2017
- BIRS, Mathematical Analysis of Biological Interaction Networks June 2017
- 2107 Korean Math Society Spring meeting April 2017
- Probability seminar, Iowa State University December 2016

DEPARTMENTAL TALKS IN UNIVERSITY OF WISCONSIN- MADISON	<ul style="list-style-type: none"> • Probability seminar April 2017 <i>Sufficient Conditions for Ergodicty of Stochastic Reaction Networks and Mixing Times</i>
	<ul style="list-style-type: none"> • Reaction network seminar April 2017 <i>Lyapunov Functions for Chemical Reaction Network Theory</i>
	<ul style="list-style-type: none"> • Graduate probability seminar March 2017 <i>Donsker's theorem and its applications</i>
	<ul style="list-style-type: none"> • Graduate probability seminar October 2016 <i>Coupling of random variables and applications for mixing times</i>
	<ul style="list-style-type: none"> • Graduate probability seminar February 2016 <i>Foster-Lyapunov criteria for positive recurrence of Markov Chains</i>
	<ul style="list-style-type: none"> • Graduate probability seminar April 2015 <i>Fundamental limits on the suppression of molecular fluctuations</i>
	<ul style="list-style-type: none"> • Graduate Applied Math Seminar August 2014 <i>Flagellar synchronization through direct hydrodynamic interactions</i>
	<ul style="list-style-type: none"> • Physics and applied math seminar November 2013 <i>Intermittent flow in Yield-Stress fluids slows down chaotic nixing</i>
	<ul style="list-style-type: none"> • RTG Seminar on mathematical fluid mechanics and applications February 2013 <i>On squirt singularities in hydrodynamics</i>
TEACHING	<p>University of California, Irvine.</p> <ul style="list-style-type: none"> • 2020 Fall Math 2A (Calculus 1, Online). • 2019 Fall Math 2A (Calculus 1). <p>University of Wisconsin-Madison</p> <ul style="list-style-type: none"> • 2017 Fall Math320 (Differential equations and Linear Algebra) • 2016 Fall Math375 (Multi-Variable Calculus and Linear Algebra) • 2016 Spring Math222 (Calculus 2) WES • 2015 Fall Math221 (Calculus 1) WES • 2015 Summer PEOPLE program (Calculus for Precollege students) • 2015 Spring Math320 (Linear Algebra and Differential Equation) • 2014 Fall Math213 (Calculus for Business) • 2014 Summer PEOPLE program (Calculus for Precollege students) (https://peopleprogram.wisc.edu/) • 2014 Spring Math213 (Calculus for Business) • 2013 Fall Math234 (Calculus 3) • 2013 Spring Math222 (Calculus 2) • 2012 Fall Math222 (Calculus 2) WES (https://www.math.wisc.edu/undergraduate/wes)
MENTORING	<ul style="list-style-type: none"> • Minseo Kim (Beckman High School, Tustin), November 2020– Research topic: Revealing the Effect of Hydration in Kidney Stone Formation Through Timescale Decomposition Analysis • Direct reading program at University of Wisconsin-Madison Spring 2017 : Mentoring undergraduate students for research on mathematical biology
SERVICE	<ul style="list-style-type: none"> • Global point of contact (Asia region), Virtual SMB 2021 June 2021 • Q&A panel, MathBioU and MathExpLR at UCI July 2020 (a summer research program for high school)

and undergraduate students)

- California Workshop on the Mathematics of Reaction Networks June 2020
University of California, Irvine (with German Enciso, Badal Joshi, Polly Yu)
(Canceled due to COVID-19)
- SIAM Life Science 2020 meeting, Minisymposium organizer: June 2020
Stochastic Modeling of Biochemical Reaction Networks and Applications
(with German Enciso) (Canceled due to COVID-19)
- Mega Math May 2016
: Grader role in mathematics competition for fifth and sixth grade
students in south-central Wisconsin

REFEREE

- Journal of the Korean Mathematical Society
- Journal of Mathematical Biology
- PLOS Computational Biology
- PLOS one
- Physical Biology
- Bulletin of Mathematical Biology
- SIAM journal on Applied Mathematics
- Discrete and Continuous Dynamical Systems - Series B