

Jinsu Kim

CONTACT INFORMATION	Room 305, Mathematical Science Building, jinsukim@postech.ac.kr POSTECH 77 Cheongam-ro, Hyogok-dong, Nam-gu, Pohang-si, http://mathjinsukim.com Gyeongsangbuk-do, Korea Republic
RESEARCH INTERESTS	Probability, Reaction networks, Mathematical systems biology, System biology, Epigenetic dynamics, Markov processes, Mixing times of Markov models.
EMPLOYMENT	POSTECH September 2021–present, Assistant Professor at Department of Mathematics University of California, Irvine July 2020–August 2021, Postdoctoral fellow at the NSF-Simons Center for Multiscale Cell Fate Research. August 2018– August 2021, Postdoctoral scholar at Department of Mathematics. <ul style="list-style-type: none">• Mentor : German Enciso
EDUCATION	University of Wisconsin-Madison 2012–2018, Ph.D., Mathematics. <ul style="list-style-type: none">• Thesis Topic : <i>Stochastically modeled reaction networks: positive recurrence and mixing times</i>• Advisor: David F. Anderson Seoul National University , Republic of Korea. 2005–2012, B.S., Mathematics (<i>military service</i> 2007–2009)
PREPRINTS	<ol style="list-style-type: none">1. David F. Anderson, Daniele Cappelletti, Wai-Tong (Louis) Fan, and Jinsu Kim. <i>Mixing times for stochastically modeled reaction networks</i>, in preparation.2. Jinsu Kim*, Katherine Sheu*, Quen Cheng, Alexander Hoffmann, and German Enciso. <i>Stochastic models of nucleosome dynamics reveal regulatory rules of stimulus-induced epigenome remodeling</i>, submitted, 2021.
PUBLICATIONS	<ol style="list-style-type: none">1. German Enciso and Jinsu Kim, <i>Accuracy of Multiscale Reduction for Stochastic Reaction Systems</i>, accepted to SIAM 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, <i>Derivation of stationary distributions of biochemical reaction networks via structure transformation</i>, Communications Biology, 4, 620 (2021). https://doi.org/10.1038/s42003-021-02117-x3. German Enciso, Radek Erban and Jinsu Kim, <i>Identifiability of Stochastically Modeled Reaction Networks</i>, 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

- Math Colloquium, POSTECH, Online. November 2021
- ReaDiNet 2021 conference, Online. October 2021
- Applied Math Colloquium, University of Maryland, Baltimore County, Online. October 2021
- 2021 ONRC Research Day, POSTECH, Online. October 2021
- APCTP Nonequilibrium collective phenomena workshop, Gyeonju. September 2021
- AIM Online workshop on “Limits and control of stochastic reaction networks” July 2021
- SMB annual meeting 2021, Online. June 2021
- SIAM on Applications of Dynamical Systems 2021, Online. May 2021
- IBS Biomedical Mathematics Group Seminar, IBS Korea. April 2021
- AMS Postdoc Talk - Mathematics & Biology, University of California, Irvine. April 2021
- 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, Virtual workshop. August 2020
- 2020 Korea Mathematical Society Spring meeting, Virtual workshop July 2020
- Early Career Researcher Symposium, Center for Multiscale Cell Fate Research, University of California, Irvine. May 2020
- 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, University of California, Irvine. October 2019
- 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, Montréal, Canada. July 2019
- Chemical reaction network workshop, DISMA Politecnico di Torino, Turin, Italy. July 2019
- Mathematical biology seminar, Korea Advanced Institute of Science and Technology (KAIST). May 2019
- Probability seminar, Tulane University. March 2019
- Biophysics and Systems Biology Seminar, University of California, Irvine March 2019
- Early-Career Research Symposium 2019, NSF-Simon Center for Multiscale Cell Fate, University of California, Irvine March 2019

- 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, Pohang University of Science and Technology. December 2017
- 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

- Probability seminar *Sufficient Conditions for Ergodicity of Stochastic Reaction Networks and Mixing Times* April 2017
- Reaction network seminar *Lyapunov Functions for Chemical Reaction Network Theory* April 2017
- Graduate probability seminar *Donsker's theorem and its applications* March 2017
- Graduate probability seminar *Coupling of random variables and applications for mixing times* October 2016
- Graduate probability seminar *Foster-Lyapunov criteria for positive recurrence of Markov Chains* February 2016
- Graduate probability seminar *Fundamental limits on the suppression of molecular fluctuations* April 2015
- Graduate Applied Math Seminar *Flagellar synchronization through direct hydrodynamic interactions* August 2014
- Physics and applied math seminar *Intermittent flow in Yield-Stress fluids slows down chaotic mixing* November 2013
- RTG Seminar on mathematical fluid mechanics and applications *On squirt singularities in hydrodynamics* February 2013

TEACHING

University of California, Irvine.

- 2020 Fall Math 2A (Calculus 1, Online).
- 2019 Fall Math 2A (Calculus 1).

University of Wisconsin-Madison

- 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
- 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
- Editorial Board
- The Journal Mathematical Biosciences & Engineering July 2021–
Special Issue of “Stochastic methods for biological systems”
- Others
- 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
- International Journal of Robust and Nonlinear Control
 - 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