

## Jinsu Kim

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CONTACT INFORMATION	Room 305, Mathematical Science Building, jinsukim@postech.ac.kr POSTECH 77 Cheongam-ro, Hyogok-dong, Nam-gu, Pohang-si, <a href="http://mathjinsukim.com">http://mathjinsukim.com</a> Gyeongsangbuk-do, Korea Republic
RESEARCH INTERESTS	Probability, Reaction networks, Mathematical systems biology, System biology, Epigenetic dynamics, Markov processes, Mixing times of Markov models.
EMPLOYMENT	<b>POSTECH</b>  September 2021–present, Assistant Professor at Department of Mathematics  <b>University of California, Irvine</b>  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"><li>• Mentor : German Enciso</li></ul>
EDUCATION	<b>University of Wisconsin-Madison</b>  2012–2018, Ph.D., Mathematics. <ul style="list-style-type: none"><li>• Thesis Topic : <i>Stochastically modeled reaction networks: positive recurrence and mixing times</i></li><li>• Advisor: David F. Anderson</li></ul> <b>Seoul National University</b> , Republic of Korea.  2005–2012, B.S., Mathematics ( <i>military service</i> 2007–2009)
PREPRINTS	<ol style="list-style-type: none"><li>1. David F. Anderson, Daniele Cappelletti, Wai-Tong (Louis) Fan, and Jinsu Kim. <i>Mixing times for stochastically modeled reaction networks</i>, in preparation.</li><li>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.</li></ol>
PUBLICATIONS	<ol style="list-style-type: none"><li>1. German Enciso and Jinsu Kim, <i>Accuracy of Multiscale Reduction for Stochastic Reaction Systems</i>, accepted to SIAM Multiscale Modeling and Simulation, 2021. <a href="https://arxiv.org/abs/1909.11916">https://arxiv.org/abs/1909.11916</a>.</li><li>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). <a href="https://doi.org/10.1038/s42003-021-02117-x">https://doi.org/10.1038/s42003-021-02117-x</a></li><li>3. German Enciso, Radek Erban and Jinsu Kim, <i>Identifiability of Stochastically Modeled Reaction Networks</i>, European Journal of Applied Mathematics, 1-23, 2021. <a href="https://doi.org/10.1017/S0956792520000492">https://doi.org/10.1017/S0956792520000492</a> <a href="https://arxiv.org/abs/2006.02272">https://arxiv.org/abs/2006.02272</a></li></ol>

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	<ul style="list-style-type: none"> <li>• Merit-based scholarship, Lotte scholarship foundation 2009–2011</li> </ul>
TALKS	<ul style="list-style-type: none"> <li>• AIM Online workshop on “Limits and control of stochastic reaction networks” July 2021</li> <li>• SMB annual meeting 2021, Online. June 2021</li> <li>• SIAM on Applications of Dynamical Systems 2021, Online. May 2021</li> <li>• IBS Biomedical Mathematics Group Seminar, IBS Korea. April 2021</li> <li>• AMS Postdoc Talk - Mathematics &amp; Biology, University of California, Irvine. April 2021</li> <li>• CRM-ISM Probability/Applied Math Seminar, Online seminar. April 2021</li> <li>• Mathematics of Reaction Networks, Online seminar. January 2021</li> <li>• Applied Math Seminar, University of California, Santa Cruz. January 2021</li> <li>• 2020 Korea Mathematical Society Fall meeting, Virtual workshop October 2020</li> <li>• Probability seminar, University of Illinois Urbana-Champaign, October 2020</li> <li>• 2020 Society for Mathematical Biology annual meeting, Virtual workshop. August 2020</li> <li>• 2020 Korea Mathematical Society Spring meeting, Virtual workshop July 2020</li> <li>• Early Career Researcher Symposium, Center for Multiscale Cell Fate Research, University of California, Irvine. May 2020</li> <li>• Mathematical and Computational Methods in Biology, MBI. May 2020</li> <li>• Probability seminar, Indiana University Bloomington. February 2020</li> <li>• Mathbio seminar, University of California, Merced. December 2019</li> <li>• AMS sectional meeting, University of California, Riverside. November 2019</li> <li>• The 2nd Annual Symposium on Multiscale Cell Fate, University of California, Irvine. October 2019</li> <li>• PDE/Applied math seminar, University of California, Riverside. October 2019</li> <li>• Probability seminar, Indiana University Bloomington. September 2019</li> <li>• AMS sectional meeting, University of Wisconsin, Madison September 2019</li> <li>• 2019 Society for Mathematical Biology annual meeting, Montréal, Canada. July 2019</li> <li>• Chemical reaction network workshop, DISMA Politecnico di Torino, Turin, Italy. July 2019</li> <li>• Mathematical biology seminar, Korea Advanced Institute of Science and Technology (KAIST). May 2019</li> <li>• Probability seminar, Tulane University. March 2019</li> <li>• Biophysics and Systems Biology Seminar, University of California, Irvine March 2019</li> <li>• Early-Career Research Symposium 2019, NSF-Simon Center for Multiscale Cell Fate, University of California, Irvine March 2019</li> <li>• Analysis seminar, Korean Institute for Advanced Study (KIAS). December 2018</li> <li>• Probability seminar, University of California, Irvine December 2018</li> <li>• SIAM LS 2018 Annual Meeting, Minnesota, USA. August 2018</li> <li>• Recent trends in continuous and discrete probability at Georgia tech. March 2018</li> </ul>

- 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 Ergodicty 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