

Hyunjoong “Hune” Kim

Simons Postdoctoral Fellow in Mathematical Biology
Department of Mathematics, University of Pennsylvania
209 S. 33rd St., Philadelphia, PA USA 19104
h6kim@sas.upenn.edu hkimmathbio.com

Research Interest	Applied Mathematics Stochastic Processes, Partial Differential Equations, Dynamical Systems, Optimization	
	Mathematical Biology Cell Biology, Developmental Biology, Morphogenesis, Biophysics	
Employment	University of Pennsylvania , Philadelphia, PA Simons Postdoctoral Fellow in Mathematical Biology Advisors: Yoichiro Mori and Joshua Plotkin	2020 - present
Education	University of Utah , Salt Lake City, UT Ph.D. in Mathematics Advisor: Paul C. Bressloff Thesis: “Mathematical models of cytoneme-based morphogenesis”	2020
	Yonsei University , Seoul, South Korea M.Sc. in Applied Mathematics Advisors: Jeehyun Lee and Hee-Dae Kwon Thesis: “Parameter estimation in epidemic models using Kalman filter”	2016
	B.Sc. in Mathematics	2014
Publications & Preprints	H. Kim , Y. Mori, and J. Plotkin, “Optimality of intercellular signaling: direct transport versus diffusion,” <i>Submitted</i> , 2022. [arXiv]	
	[7] S. Park*, H. Kim *, Y. Wang, D.S. Eom, and J.F. Allard, “Zebrafish airinemes optimize between ballistic search and diffusive search,” Accepted by <i>eLife</i> , 2022. [bioRxiv] [DOI]	
	[6] M.-J. Muñoz-López, H. Kim , and Y. Mori, “A reduced 1D stochastic model of bleb-driven cell migration,” Accepted by <i>Biophysical Journal</i> , 2022. [DOI]	
	[5] H. Kim and P.C. Bressloff, “Stochastic Turing pattern formation in a model with active and passive transport,” <i>Bulletin of Mathematical Biology</i> , 82 144, 2020. [DOI]	
	[4] H. Kim and P.C. Bressloff, “Impulsive signaling model of cytoneme-based morphogen gradient formation,” <i>Physical Biology</i> , 16 056005, 2019. [DOI]	
	[3] P.C. Bressloff and H. Kim , “Search-and-capture model of cytoneme-mediated morphogen gradient formation,” <i>Physical Review E</i> , 99 052401, 2019. [DOI]	
	[2] H. Kim and P.C. Bressloff, “Direct vs. synaptic coupling in a mathematical model of cytoneme-based morphogen gradient formation,” <i>SIAM Journal on Applied Mathematics</i> , 78 2323-2347, 2018. [DOI]	
	[1] P.C. Bressloff and H. Kim , “Bidirectional transport model of morphogen gradient formation via cytonemes,” <i>Physical Biology</i> , 15 026101, 2018. [DOI]	
Academic Visit	NSF-Simons Center for Multiscale Cell Fate Research University of California, Irvine, CA, Jul. 1 ~ Aug. 9 (6 weeks) Collaborated with <i>Jun Allard</i> and an experimentalist <i>Dae Seok Eom</i> Funded by the Center	2019

Honors & Funding	BioFire Scholar Award Approximately two awards are given in an academic year	2020
	Mathematics Department Summer Research Fellowship Approximately four awards are given in an academic year	2019
	Brain Korea 21 Scholarship for Leading Universities and Students National Research Foundation of Korea	2014 - 2016
	Honors Student of Yonsei University Top 10% GPA of the students are given in the college of science in a semester	2012
	Distinguished Honors Student of Yonsei University Approximately two honors are given in the college of science in a semester	2007
	National Science and Technology Scholarship Korea Student Aid Foundation Top 2% Korea SAT of the students are awarded for 8 semesters	2007
Teaching	Department of Mathematics, University of Pennsylvania AMCS 602: Algebraic Techniques for Applied Mathematics and Computational Science I	2021 Fall
	Department of Mathematics, University of Utah MATH 1320: Engineering Calculus II MATH 1210: Calculus I MATH 1030: Introduction to Quantitative Reasoning MATH 1310: Engineering Calculus I (Lab) MATH 1210: Calculus I (Lab) MATH 2250: Differential Equations and Linear Algebra (Lab)	2019 Fall 2019 Fall 2019 Spring, 2018 Fall 2018 Spring 2017 Spring and Fall 2016 Fall
	Department of Computational Science and Engineering, Yonsei University CSE 5810: Numerical Analysis (Grader)	2015 Spring and Fall 2014 Fall
	Advising	
	Ya Gao Co-advised Penn graduate student on analyzing traveling waves in random networks	2022
	Presentations	
A simple stochastic model of bleb-driven cell migration SIAM Conference on the Life Sciences, Pittsburgh, PA	2022	
Performance-Efficiency Trade-off of Stochastic Directional Search Processes SIAM Annual Meeting, Pittsburgh, PA	2022	
Effect of intrinsic noise on dynamical systems: a stochastic model of bleb-driven cell migration Applied Mathematics Seminar, University of Georgia, Athens, GA	2022	
Intercellular communication by direct contact: is it better than diffusion? Mathematical Biology Seminar, New Jersey Institute of Technology, Newark, NJ	2021	
Direct contact vs. diffusion in the efficiency of intercellular transport University of Houston, Houston, TX	2021	
Stochastic Turing pattern formation in a model with active and passive transport SIAM Conference on Applications Dynamical Systems (Virtual)	2021	
Communication by touch: modeling perspectives Mathematical Biology Seminar, University of Pennsylvania, Philadelphia, PA	2020	

Do cytonemes form a morphogen gradient via a random search? 2019
 Annual Symposium on Multiscale Cell Fate, Irvine, CA (Poster)
Symposium Travel Award

Do developmental cells really communicate via diffusing particles? 2019
 Applied Mathematics Seminar, California State University, Northridge, CA

Stochastic processes in cytoneme-mediated cell development 2019
 SIAM Wasatch Student Chapters Conference, Logan, UT

Mathematical models of cytoneme-based morphogen gradient formation 2018
 SIAM Conference on the Life Sciences, Minneapolis, MN (Poster)

Estimation of the reproduction number of pandemic influenza A (H1N1) in Korea 2009 2015
 Korean Mathematical Society Annual Meeting, Seoul, South Korea

Estimating parameters in mathematical epidemic model by using Kalman filter 2014
 Korean SIAM Annual Meeting, Seogwipo, South Korea (Poster)
Best Poster Prize

Service

Member, Preliminary Exam Committee 2021
 Department of Mathematics, University of Pennsylvania, Philadelphia, PA - 2022

Organizer, Mathematical Biology Seminar 2021
 University of Pennsylvania, Philadelphia, PA

Student Representative, Applied Mathematics Graduate Student Group 2015
 Yonsei University, Seoul, South Korea

President, Mathematics Honors Student Group 2013
 Yonsei University, Seoul, South Korea

Sergeant, Signal Intelligence Specialist 2009
 Republic of Korea Air Force, Mandatory - 2010

Student Representative, Science Undergraduate Students' Class 3 2008
 Yonsei University, Seoul, South Korea

Proficiency

Computer Skills
 MATLAB, LaTeX, Adobe Illustrator, Mathematica, Maple, XPPAUT, R, C++, Fortran.

Language
 Professional proficiency in English
 Native proficiency in Korean

Referees

<p>Paul C. Bressloff Professor Department of Mathematics University of Utah <i>bressloff@math.utah.edu</i></p> <p>Joshua B. Plotkin Professor Department of Mathematics and Biology University of Pennsylvania <i>jplotkin@sas.upenn.edu</i></p>	<p>Yoichiro Mori Professor Department of Mathematics and Biology University of Pennsylvania <i>y1mori@math.upenn.edu</i></p> <p>Jun F. Allard Associate Professor Department of Mathematics and Physics University of California, Irvine <i>jun.allard@uci.edu</i></p>
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Sean D. Lawley
Associate Professor
Department of Mathematics
University of Utah
lawley@math.utah.edu

William H. Nesse
Associate Professor (Lecturer)
Department of Mathematics
University of Utah
nesse@math.utah.edu