

# Hyunjoong “Hune” Kim

Simons Postdoctoral Fellow in Mathematical Biology  
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<b>Research Interest</b>	<b>Applied Mathematics</b> Stochastic Processes, Partial Differential Equations, Dynamical Systems, Optimization	
	<b>Mathematical Biology</b> Cell Biology, Developmental Biology, Morphogenesis, Biophysics	
<b>Employment</b>	<b>University of Pennsylvania</b> , Philadelphia, PA Simons Postdoctoral Fellow in Mathematical Biology Advisors: Yoichiro Mori and Joshua Plotkin	2020 - present
<b>Education</b>	<b>University of Utah</b> , Salt Lake City, UT Ph.D. in Mathematics Advisor: Paul C. Bressloff Thesis: “Mathematical models of cytoneme-based morphogenesis”	2020
	<b>Yonsei University</b> , 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
<b>Academic Visit</b>	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> <b>Funded by the Center</b>	2019
<b>Publications &amp; Preprints</b>	<b>H. Kim</b> , Y. Mori, and J. Plotkin, “Stochastic honey bee scouting model under risk of predation,” <i>In preparation</i> , 2021+. <b>H. Kim</b> , Y. Mori, and J. Plotkin, “Optimal cytoskeletal structure for intracellular transport mediated by molecular motors and diffusion,” <i>In preparation</i> , 2021+. <b>H. Kim</b> , Y. Mori, and J. Plotkin, “Direct contact vs. diffusion in the efficiency of intercellular particle transport,” <i>In manuscript</i> , 2021. M.-J. Muñoz-López, <b>H. Kim</b> , and Y. Mori, “Stochastic modeling of bleb-driven cell migration,” <i>Under revision</i> , 2021.	
	[6] S. Park*, <b>H. Kim</b> *, Y. Wang, D.S. Eom, and J.F. Allard, “Zebrafish airinemes optimize between ballistic search and diffusive search,” <i>Accepted</i> , 2021.	
	[5] <b>H. Kim</b> and P.C. Bressloff, “Stochastic Turing pattern formation in a model with active and passive transport,” <i>Bulletin of Mathematical Biology</i> , <b>82</b> 144, 2020.	
	[4] <b>H. Kim</b> and P.C. Bressloff, “Impulsive signaling model of cytoneme-based morphogen gradient formation,” <i>Physical Biology</i> , <b>16</b> 056005, 2019.	
	[3] P.C. Bressloff and <b>H. Kim</b> , “Search-and-capture model of cytoneme-mediated morphogen gradient formation,” <i>Physical Review E</i> , <b>99</b> 052401, 2019.	

- [2] **H. Kim** and P.C. Bressloff, “Direct vs. synaptic coupling in a mathematical model of cytoneme-based morphogen gradient formation,” *SIAM Journal on Applied Mathematics*, **78** 2323-2347, 2018.
- [1] P.C. Bressloff and **H. Kim**, “Bidirectional transport model of morphogen gradient formation via cytonemes,” *Physical Biology*, **15** 026101, 2018.

## 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	2019 Fall
MATH 1210: Calculus I	2019 Fall
MATH 1030: Introduction to Quantitative Reasoning	2019 Spring, 2018 Fall
MATH 1310: Engineering Calculus I (Lab)	2018 Spring
MATH 1210: Calculus I (Lab)	2017 Spring and Fall
MATH 2250: Differential Equations and Linear Algebra (Lab)	2016 Fall
Department of Computational Science and Engineering, Yonsei University	
CSE 5810: Numerical Analysis (Grader)	2015 Spring and Fall 2014 Fall

## Presentations

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? Annual Symposium on Multiscale Cell Fate, Irvine, CA (Poster) <b>Symposium Travel Award</b>	2019
Do developmental cells really communicate via diffusing particles? Applied Mathematics Seminar, California State University, Northridge, CA	2019

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 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

*Sergent*, 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**

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

Language  
 Professional proficiency in English  
 Native proficiency in Korean