Hyunjoong “Hune” Kim

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

Research Interest

Applied Mathematics
Stochastic Processes, Partial Differential Equations, Optimization, Dynamical Systems

Mathematical Biology
Cell Biology, Developmental Biology, Morphogenesis, Biophysics

Employment

University of Pennsylvania, Philadelphia, PA — 2020 - present
Simons Postdoctoral Fellow in Mathematical Biology
Advisors: Yoichiro Mori and Josh Plotkin

Education

University of Utah, Salt Lake City, UT
Ph.D. in Mathematics — 2020
Advisor: Paul C. Bressloff
Thesis: “Mathematical models of cytoneme-based morphogenesis”

Yonsei University, Seoul, South Korea
M.Sc. in Applied Mathematics — 2016
Advisors: Jeehyun Lee and Hee-Dae Kwon
Thesis: “Parameter estimation in epidemic models using Kalman filter”

B.Sc. in Mathematics — 2014

Academic Visit

NSF-Simons Center for Multiscale Cell Fate Research — 2019
University of California, Irvine, CA, Jul. 1 ~ Aug. 9 (6 weeks)
Collaborated with *Jun Allard* and an experimentalist *Dae Seok Eom*
Funded by the Center

Publications

M.-J. Muñoz-López, **H. Kim**, and Y. Mori, “Stochastic modeling of bleb-driven cell migration,” *In preparation*, 2021.

S. Park, **H. Kim**, D.S. Eom, and J.F. Allard, “Zebrafish airinemes optimize between ballistic search and diffusive search,” *Submitted*.

[5] **H. Kim** and P.C. Bressloff, “Stochastic Turing pattern formation in a model with active and passive transport,” *Bulletin of Mathematical Biology*, **82** 144, 2020.

[4] **H. Kim** and P.C. Bressloff, “Impulsive signaling model of cytoneme-based morphogen gradient formation,” *Physical Biology*, **16** 056005, 2019.

[3] P.C. Bressloff and **H. Kim**, “Search-and-capture model of cytoneme-mediated morphogen gradient formation,” *Physical Review E*, **99** 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 — 2020
Approximately two awards are given in an academic year

Mathematics Department Summer Research Fellowship — 2019
Approximately four awards are given in an academic year

Brain Korea 21 Scholarship for Leading Universities and Students — 2014 - 2016
National Research Foundation of Korea

Honors Student of Yonsei University — 2012
Top 10% GPA of the students are given in the college of science in a semester

Distinquished Honors Student of Yonsei University — 2007
Approximately two honors are given in the college of science in a semeter

National Science and Technology Scholarship — 2007
Korea Student Aid Foundation
Top 2% Korea SAT of the students are awarded for 8 semesters

Presentations

Stochastic Turing pattern formation in a model with active and passive transport — 2021
SIAM Conference on Applications Dynamical Systems, Virtual

Communication by touch: modeling perspectives — 2020
Mathematical Biology Seminar, University of Pennsylvania, Philadelphia, PA

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 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

Teaching

Full Instructor, 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

Lab Instructor, Department of Mathematics, University of Utah

MATH 1310: Engineering Calculus I	2018 Spring
MATH 1210: Calculus I	2017 Spring and Fall
MATH 2250: Differential Equations and Linear Algebra	2016 Fall

Grader, Department of Computational Science and Engineering, Yonsei University

CSE 5810: Numerical Analysis (Graduate Level)	2015 Spring and Fall 2014 Fall

Service

Organizer, Penn Mathematical Biology Seminar — 2021
University of Pennsylvania, Philadelphia, PA — Spring

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 - 2010
Republic of Korea Air Force, Mandatory

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

Proficiency

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

Language
Professional proficiency in English
Native proficiency in Korean