Hyukpyo Hong

CONTACT INFORMATION

Department of Mathematical Sciences, KAIST
291 Daehak-ro, Yuseong-gu, Daejeon 34141 Korea
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55 Expo-ro, Yuseong-gu, Daejeon 34126 Korea

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RESEARCH INTERESTS

Chemical reaction network theory, Stochastic modeling of biochemical reaction systems, Bayesian inference, Quasi-steady-states approximation, Stochastic model reduction, Wearable data analysis, Fractal physiology

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea

Integrated Master's & Ph.D. Program, 2018 – Aug. 2023 (expected)
Advisor: Jae Kyoung Kim (jaekkim@kaist.ac.kr)

Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea

Bachelor of Mathematical Sciences, 2013 – 2017 (Cum Laude)

PAPERS

†: co-1st author, *: co-corresponding author. One can enter the article web page by clicking the underlined title of a paper.

1. **Hyukpyo Hong**†, Ji Yun Noh†, Hyojung Lee, Sunhwa Choi, Boseung Choi, Jae Kyoung Kim*, Eui-Cheol Shin*, Modeling incorporating the severity-reducing long-term immunity: higher viral transmission paradoxically reduces severe COVID-19 during endemic transition, accepted for *Immune Network*, 2022
2. Dae Wook Kim†, **Hyukpyo Hong**† and Jae Kyoung Kim*, Systematic inference identifies a major source of heterogeneity in cell signaling dynamics: the rate-limiting step number, *Science Advances*, 2022
3. Yun Min Song†, **Hyukpyo Hong**† and Jae Kyoung Kim*, Universally valid reduction of multiscale stochastic biochemical systems with simple non-elementary propensities, *PLoS Computational Biology*, 2021
4. Mark Jayson Cortez, **Hyukpyo Hong**, Boseung Choi*, Jae Kyoung Kim*, and Krešimir Josić*, Hierarchical Bayesian models for inference in biochemical reactions with delays, *Bioinformatics*, 2021
5. Jaehyoung Hong†, Su Jung Choi†, Se Ho Park, **Hyukpyo Hong**, Victoria Booth, Eun Yeon Joo*, and Jae Kyoung Kim*, Personalized sleep-wake patterns aligned with circadian rhythm relieve daytime sleepiness, *iScience*, 2021
6. **Hyukpyo Hong**†, Jinsu Kim†, M. Ali Al-Radhawi, Eduardo D. Sontag, Jae Kyoung Kim*, Derivation of stationary distributions of biochemical reaction networks via structure transformation, *Communications Biology*, 2021.

BOOK CHAPTERS

1. **Hyukpyo Hong**, Boseung Choi, and Jae Kyoung Kim, Beyond the Michaelis-Menten: Bayesian inference for enzyme kinetic analysis, Quentin Vanhaelen (Ed.), *Computational Methods for Estimating the Kinetics Parameters of Biological Systems*, Methods in Molecular Biology, vol 2385. Humana, New York, NY.

Honors and Awards

2019 - 2023 Global Ph.D. Fellowship (Full Tuition), NRF

2021 KSIAM Conference Poster Presentation Award, KSIAM

2017 36th National Undergraduate Mathematic Competition Silver Award, KMS

2014 33rd National Undergraduate Mathematic Competition Silver Award, KMS

2016 Mirae Asset Global Exchange Scholarship, Mirae Asset Park Hyeon Joo Foundation

2014 Dean's List Award, College of Natural Sciences, KAIST

2013 32nd National Undergraduate Mathematic Competition Silver Award, KMS

2013 – 2017 The National Scholarship for Science and Engineering (Full Tuition), KOSAF

Abbreviations
NRF: National Research Foundation of Korea,
KMS: Korean Mathematical Society
KSIAM: Korean Society for Industrial and Applied Mathematics
KOSAF: Korea Student Aid Foundation,

Invited talks

August 27, 2021: KSMB Annual Meeting — Jeju, Korea
Inference of stochastic dynamics in biochemical reaction networks — Special session

June 16, 2021: SMB Annual Meeting — Online
Inference of stochastic dynamics in biochemical reaction networks — Minisymposium

May 27, 2021: SIAM Conference on Dynamical Systems — Online
Derivation of stationary distributions of stochastic chemical reaction networks via network translation — Minisymposium

May 13, 2021: Seminar on the Mathematics of Reaction Networks [link] — Online
Derivation of stationary distributions of stochastic chemical reaction networks via network translation.

October 24, 2020: KMS Annual Meeting — Online
Derivation of stationary distributions of biochemical reaction networks via structure transformation — Minisymposium

Contributed talks and Posters

December 17, 2021: KSMB Winter Conference — Jeju, Korea
Derivation of stationary distributions of stochastic chemical reaction networks via network translation — Poster

December 04, 2021: KSIAM Annual Conference — Busan, Korea
Derivation of stationary distributions of stochastic chemical reaction networks via network translation — Poster

September 28, 2021: Non-equilibrium collective phenomena workshop — Gyeongju, Korea
Derivation of stationary distributions of stochastic chemical reaction networks via network translation — Poster

June 26, 2021: KSIAM Spring Conference — Gangneung, Korea
Derivation of stationary distributions of biochemical reaction networks via structure transformation — Contributed talk

November 13, 2020: KSIAM Annual Meeting — Online
Derivation of stationary distributions of biochemical reaction networks via structure transformation — Poster

August 20, 2020: SMB Annual Meeting — Online

Derivation of stationary distributions of biochemical reaction networks via structure transformation — Contributed talk

July 23, 2019: SMB Annual Meeting — Montreal, Canada
Product-Form Stationary Distributions for Non-Complex Balanced Networks — Poster

July 8, 2019: Chemical Reaction Networks Workshop — Torino, Italy
Product-Form Stationary Distributions for Non-Complex Balanced Networks — Short talk

May 18, 2019: KSIAM Spring Conference — Seoul, Korea
Product-Form Stationary Distributions for Non-Complex Balanced Networks — Contributed talk

May 11, 2019: A3 Workshop on Mathematical Life Science — Beijing, China
Product-Form Stationary Distributions for Non-Complex Balanced Networks — Student talk

Teaching Experience

Undergraduate Research Program (URP) (Spring 2019)
Mentor — KAIST, Daejeon, Korea

– Mentoring an undergraduate student. Discussed with and guided the student to investigate *the total quasi-steady-state approximation for a competitive system.* The student won poster presentation prize in 2019 KSIAM Spring conference and prize in URP final evaluation.

Introduction to Mathematical Biology (Fall 2018)
Teaching Assistant — KAIST, Daejeon, Korea

– Prepared and graded quiz problems and MATLAB homeworks weekly.

Linear Algebra (Spring 2018)
Teaching Assistant — KAIST, Daejeon, Korea

– Prepared and graded quiz problems.

Introduction to Linear Algebra (Spring 2018), Differential Equations (Fall 2018, Spring 2019)
Teaching Assistant — KAIST, Daejeon, Korea

– Graded quiz problems and homeworks weekly.
– Graded the midterm and final exams.

Service

June 13-17, 2021: Support Staff, SMB Annual Meeting — Online
Host zoom links of sessions for Asia time zone.