Jae Kyoung Kim

CONTACT INFORMATION

Department of Mathematical Science
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EDUCATION

University of Michigan, Ann Arbor, Michigan, USA

Ph.D. Applied and Interdisciplinary Mathematics, 2008–2013

- Advisors: Daniel Forger, Victoria Booth
- Dissertation: Mathematical Modeling and Analysis of Cellular Clocks (Sumner B. Myers Prize)

Seoul National University, Seoul, Republic of Korea

Bachelor of Mathematics Education, 2001 – 2005 (Summa Cum Laude)

ACADEMIC APPOINTMENT

Department of Mathematical Science, KAIST, Daejeon, Korea

Associate Professor. 2018-Present
Assistant Professor. 2015-2018

Biomedical Mathematics Research Group, IBS, Daejeon, Korea

Chief Investigator. 2021-Present

Young Korean Academy of Science and Technology, Korea

Member. 2019-Present

Korea Institute for Advanced Study, Korea

Associate Member. 2018-Present

Department of Mathematics, University of Michigan, Ann Arbor, Michigan, USA

Visiting Scholar. 2019-2020

Mathematical Biosciences Institute, The Ohio State University, Columbus, OH, USA

Postdoctoral Fellow. 2013-2015

RESEARCH INTERESTS

Nonlinear dynamics, Stochastic process, Singular perturbation, Parameter estimation
Systems biology, Synthetic biology, Biochemical networks, Circadian rhythms, Sleep-Wake cycle

HONORS AND AWARDS

2021 1st Choi Seok-jeong Award (Minister Award)	Korea Ministry of Science and ICT
2019 J. Shelton Horsley Research Award	Virginia Academy of Science
2017 1st KSIAM Young Researcher Award	Korea Society of Industrial & Applied Math
2017 & 2019 Best Teaching Award	College of Natural Sciences, KAIST
2017 EWon Assistant Professorship for Outstanding Junior Faculty	KAIST
2016 30 Young Leading Scientists of Korea	POSTEC & Dong-A Daily News
2015 Sangsan Young Mathematician Award	The Korean Mathematical Society
2015 TJ Park Science Fellowship	POSCO TJ Park Foundation
2013 Sumner B. Myers Prize for the best math Ph.D. thesis	University of Michigan
2012 Department of Mathematics Outstanding Teaching Award	University of Michigan
2010 Rackham International Student Fellowship	University of Michigan
2006 The Air Force Chief of Staff's Award, Pedagogic Method Announcement Contest	ROKAF
2005 Dean's Citation for Excellent Learning	Seoul National University

PUBLICATIONS $^{+}$: co-corresponding author, *: co-1st author

53. Hong HH, Hernandez BS, Kim J,**Kim JK**, Computational translation framework identifies biochemical reaction networks with special topologies and their long-term dynamics, *SIAM Applied Math* (2023)

52. Vu Thi NA, Song YM, Tran Thi Q, Yum HY, Kim SK^{+}, Chae JW^{+}, Kim JK^{+}, Beyond the Michaelis-Menten: Accurate Prediction of Drug Interactions through Cytochrome P450 Induction, *Clinical Pharmacology & Therapeutics* (2022)

51. Kim DW, Byun JM, Lee JK, **Kim JK**$^{+}$, Koh Y^{+}, Chemotherapy delivery time affects anti-lymphoma treatment outcome in a sex-dependent manner, *JCI Inisght* (2022)

50. Abe YO, Yoshitane H, Kim DW, Koebis M, Aiba A, **Kim JK**$^{+}$, Fukada Y^{+}, Rhythmic transcription of Bmal1 stabilizes the circadian timekeeping system in mammals *Nature Communications* (2022)

49. Ryu HJ, Kang WH, Kim T, **Kim JK**, Shin KH, Chae JW, Yun HY, A compatibility evaluation between the physiologically based pharmacokinetic (PBPK) model and the compartmental PK model using the lumping method with real cases, *Frontiers in Pharmacology* (2022)

48. Lee J, Ha S, Ahmed O, Cho IK, Lee D, Kim K, Kang S, Lee S, Suh S, Chung S, K**Kim JK**, Validation of a Korean version of the Metacognitions Questionnaire-Insomnia (MCQ-I) and development of shortened versions of the rating scale: a random forest approach, Sleep Medicine (2022)

47. H, Noh JY, Lee H, Choi S, Choi B, **Kim JK**$^{+}$, Shin EC^{+}, Modeling Incorporating the Severity-Reducing Long-term Immunity: Higher Viral Transmission Paradoxically Reduces Severe COVID-19 During Endemic Transition *Immune Networks* (2022)

46. Tyson JJ, Csikasz-Nagy A, Gonze D, **Kim JK**, Santos S, Wolf J, Time-keeping and decision-making in living cells: Part II, *Interface Focus*(2022)

45. Tyson JJ, Csikasz-Nagy A, Gonze D, **Kim JK**, Santos S, Wolf J, Time-keeping and decision-making in living cells: Part I, *Interface Focus* (2022)

44. Jeong EM, Song YM, **Kim JK**, Combined multiple transcriptional repression mechanisms generate ultrasensitivity and oscillations *Interface Focus* (2022)

43. Kim DW, Hong H, **Kim JK**, Systematic inference identifies a major source of heterogeneity in cell signaling dynamics: the rate-limiting step number , *Sceicne Advances* (2022)

42. Jeong EM, Kwon M, Cho E, Lee SH, Kim EY^{+}, **Kim JK**$^{+}$, Systematic modeling-driven experiments identify distinct molecular clockworks underlying hierarchically organized pacemaker neurons, *PNAS* (2022)

41. Paya ML, Kim DW, Somers DE, **Kim JK**$^{+}$, Foo M^{+}, Modeling of Plant Circadian Clock for Characterizing Hypocotyl Growth under Different Light QualityConditions, *in silico Plant* (2022)

40. Song YM, Hong H, **Kim JK**, Universally valid reduction of multiscale stochastic biochemical systems using simple non-elementary propensities, *PLoS Comput. Biol.* (2021)

39. Hong J, Choi SJ, Park SH, Hong H, Booth V, Joo EY^{+}, **Kim JK**$^{+}$, Personalized sleep-wake patterns aligned with circadian rhythm relieve daytime sleepiness, *iScience* (2021)

38. Tyler J, Forger DB, **Kim JK**$^{+}$, Inferring causality in biological oscillators, *Bioinformatics* (2021)

37. Cortez MJ, Hong H, Choi B^{+}, **Kim JK**$^{+}$, Josic K^{+}, Hierarchical Bayesian models for inference in biochemical reactions with delays, *Bioinformatics* (2021)

36. Hong H, Kim JS, Ali M, Sontag ED, **Kim JK**, Derivation of stationary distributions of bio-

chemical reaction networks via structure transformation, *Communication Biology* (2021)

35. Bolsiusa YG, Zurbriggen MD, **Kim JK**, Kasa MJ, Meerloa P, Aton SJ, Havekesa R, The role of clock genes in sleep, stress and memory, *Biochemical Pharmacology* (2021)

34. MA EY*, Kim JW*, Lee Y, Cho SW, Kim H, **Kim JK**, Combined unsupervised supervised machine learning for phenotyping complex diseases with its application to obstructive sleep apnea, *Scientific Reports* (2021)

33. Beesley S*, Kim DW*, DAlessandro M, Jin Y, Lee K, Joo H, Young Y, Tomko R, **Kim JK**$^+$, Lee C$^+$, Wake-sleep cycles are severely disrupted by diseases affecting cytoplasmic homeostasis, *PNAS* (2020) (Editor's choice of Sci Trans Med)

32. **Kim JK**$^+$, Tyson JJ, Misuse of the Michaelis-Menten rate law for protein-interaction networks and its remedy, *PLoS Comput Biol* (2020)

31. Kim DW, Eder Z$^+$, **Kim JK**$^+$, Wearable technology and systems modeling for personalized chronotherapy, *Curr Opin Syst Biol* (2020)

30. C Nguyen, **Kim JK**, SK Han, Robust and Tunable Toggle Switches with Interlocked Positive Feedback Loops, *J Korean Physi Soc* (2020)

29. Back HM, Yun HY, Kim SK$^+$, **Kim JK**$^+$, Beyond the Michaelis-Menten: Prediction of in vivo clearance for drugs with low K_M, *Clin. Transl. Sci.* (2020)

28. Masuda S, Narasimamurthy R, Yoshitane H, **Kim JK**, Fukada Y, Virshup DM, Mutation of a PER2 phosphodegron perturbs the circadian phosphoswitch, *PNAS* (2020).

27. Zou X, DW Kim, Gotoh T, Liu J, **Kim JK**, Finkielstein CV, A systems biology approach identifies hidden regulatory connections between the circadian and cell-cycle checkpoints, *Front. Physiol.* (2020)

26. Choi B, Cheng YY, Cinar S, Ott W, Bennett MR, Josic K$^+$, **Kim JK**$^+$, Bayesian inference of distributed time delay in transcriptional and translational regulation, *Bioinformatics* (2020)

25. **Kim JK**$^+$,*, Chen Y*, Hirning A, Alnahhas R, Josić K$^+$, Bennett MR$^+$. Long-range temporal coordination of gene expression in spatially extended synthetic microbial consortia, *Nature Chem Biol* (2019)

24. Ali K*, **Kim JK***, Jan M, Khan H, Khan I, Shen M, Park J, Lim CJ, Hussain S, Baek D, Wang K, Chung W, Vicente R, Lee SY, Gong Z, Kim WY, Bressan RA, Pardo JM, Yun DJ, Rheostatic control of ABA signaling through HOS15-mediated OST1 degradation, *Molecular Plant* (2019)

23. Choi B, Cheng YY, Cinar S, Ott W, Bennett MR, Josić K$^+$, **Kim JK**$^+$, Bayesian inference of distributed time delay in transcriptional and translational regulation, *Bioinformatics* (2019)

22. Kim DW, Chang C$^+$, Chen X, Doran A, Gaudreault F, Wager T, DeMarco GJ, **Kim JK**$^+$, Systems approach reveals photosensitivity and PER2 level as determinants of clock modulator efficacy, *Mol Syst Biol* (2019; Cover article)

21. Jo H, Kim Y, **Kim JK**, Foo M, Somers DE, Kim P, Waveforms of Molecular Oscillations Reveal Circadian Timekeeping Mechanisms, *Communications Biol* (2018)

20. Liu J, Zou X, Gotoh T, Brown AM, Jiang L, **Kim JK**, Finkielstein CV, Distinct control of PERIOD2 degradation and circadian rhythms by the oncoprotein MDM2, *Science Signaling* (2018)

19. Bellman J*, **Kim JK***, Lim S, Hong C, Modeling reveals a key mechanism for light-dependent phase shifts of Neurospora circadian rhythms, *Biophy J* (2018)

18. Narasimamurthy R, Hunt S, Lu Y, Fustin JM, Partch CL, Okamura H, Partch CL, Forger DB, **Kim JK**, Virshup DM, CK1 protein kinases prime the PER2 circadian phosphoswitch, *PNAS* (2018)

17. Choi B, Rempala G, **Kim JK**, Beyond Michaelis-Menten: Accurate and efficient estimation of enzyme kinetic parameters, *Scientific Report* (2017)

16. DAlessandro M*, Beesley S*, **Kim JK***, Jones Z, Chen R, Vera D, Kyle K, Pagano M, Nowakowski R, Lee C, Stability of the circadian system requires a robust degradation of PERIOD, *Current Biol* (2017)

15. **Kim JK**$^+$, Rempala G$^+$, Kang H$^+$, Reduction for stochastic reaction network with multi-scale conservation, *SIAM Multiscale Model Simul* (2017)

14. **Kim JK**$^+$, Sontag E$^+$, Reduction of Multiscale Stochastic Biochemical Reaction Networks using Exact Moment Derivation, *PLoS Comput Biol* (2017)

13. Gotoh T*, **Kim JK***$^+$, Liu J, Vila-Caballer M, Stauffer PE, Tyson JJ, Finkielstein C$^+$, A systems-driven experimental approach reveals the complex regulatory distribution of p53 by circadian factors, *PNAS* (2016)

12. **Kim JK**, Protein sequestration versus Hill-type repression in circadian clock models, *IET Syst Biol* (2016)

11. DAlessandro M, Beesley S, **Kim JK**, Chen R, Abich E, Cheng W, Yi P, Takahashi JS, Lee C, A tunable artificial circadian clock in clock-defective mice, *Nature Commun* (2015)

10. **Kim JK**$^+$, Josić K$^+$, Bennett MR$^+$, The relationship between deterministic and stochastic quasi-steady state approximation, *BMC Syst Biol* (2015)

9. Zhou M*, **Kim JK***, Ling Eng GW, Forger DB, Virshup DM, A Period2 Phosphoswitch Regulates and Temperature Compensates Circadian Period *Molecular Cell* (2015)

8. Chen Y*, **Kim JK***, Hirning A, Josić K, Bennett MR, Emergent genetic oscillations in a synthetic microbial consortium. *Science* (2015)

7. **Kim JK**, Josić K, Bennett MR, The Validity of Quasi-Steady-State Approximations in Discrete Stochastic Simulations, *Biophy J* (2014)

6. **Kim JK**$^+$, Kilpatrick Z, Bennett MR, Josić K$^+$, Molecular mechanisms that regulate the coupled period of the mammalian circadian clock, *Biophy J* (2014) (*Featured article of journal*)

5. Goriki A, Hatanaka F, Myung J, **Kim JK** Yoritaka T, Tanoue S, Abe T, et. al.. A novel protein, CHRONO, functions as a core component of the mammalian circadian clock, *PLoS Biol* (2014)

4. **Kim JK**, Forger DB, Marconi M, Wood D, Doran A, Wager TT, Chang C Walton K, Modeling and validating chronic pharmacological manipulation of circadian rhythms, *CPT Pharmacometrics Syst Pharmacol* (2013)

3. **Kim JK** Jackson T, Mechanisms that enhance sustainability of p53 pulses, *PLoS ONE*, (2013)

2. **Kim JK** Forger DB, A mechanism for robust circadian timekeeping via stoichiometric balance, *Mole Syst Biol* (2012) (*Recommended reading by F1000*)

1. **Kim JK** Forger DB, On the Existence and Uniqueness of Biological Clock Models Matching Experimental Data, *SIAM J APPL MATH* (2012)

In Preparation

Chae SJ, Kim DW, Lee S, **Kim JK**, Spatially coordinated collective phosphorylation filters spatiotemporal noises for precise circadian timekeeping (submitted)

Park SH, Ha S, **Kim JK**, A general model-based causal inference overcomes the curse of synchrony and indirect effect (submitted)

Hong H, Cortez MJ, Cheng YY, Kim HJ, Choi B, Josic K, **Kim JK**, Inferring delays in partially observed gene regulatory networks (submitted)

Book Chapters

Kim JK Tick, Tock, Circadian Clocks. In: Kraikivski P. (eds) *Case Studies in Systems Biology* Springer (2021)

Hong H, Choi, B, **Kim JK** , Beyond the Michaelis?Menten: Bayesian Inference for Enzyme Kinetic Analysis. In Quentin Vanhaelen (Ed.) Computational Methods for Estimating the Kinetic Parameters of Biological Systems, Springer US (2021)

Grant

2021-2026 Biomedical Mathematics Group, IBS (PI), $5,000,000

2020-2024 Inference of dynamic networks from timeseries big data in biological systems, Samsung STF Foundation (PI), $900,000

2018-2023 Development of Next Generation Anticancer Immune Cell Therapy using Gene Editing, Creative Allied Project (Collaborator), $250,000

2018 Computational phenotyping for precision medicine of Sleep Apnea, End Run Project (PI), $50,000

2017-2020 The molecular circadian clock as a causal mediator of sleep-regulated neurophysiology and cognition, Human Frontier Science Program Young Investigator Award (Co-PI), $1,350,000

2017-2020 The reverse engineering algorithm based on convergence cross mapping and machine learning, Ewon Fellowship (PI), $60,000

2016-2021 Investigation of circadian clocks and their interactions with cancer by the development of theory for reduction of stochastic systems and mathematical modeling, Korea National Research Foundation Young Investigator Grant (PI), $550,000

2016-2019 Mathematical modeling for a new drug development regulating circadian rhythms, Pfizer Inc, Boston (PI), $100,000

2016-2018 Simplification and mathematical modeling of stochastic biochemical networks, TJ Park Science Fellowship (PI), $70,000

2015-2016 KAIST Industrial Mathematics Ignition Program, National Institute of Mathematical Sciences (collaborator), $350,000

Editorial Work

Editorial Board Member of Current Opinion in Systems Biology	2022-present
Editorial Board Member of J of Biological Rhythms	2020-present
Editorial Board Member of PLoS ONE (Biophysics)	2018-present
Guest Associate Editor of PLoS Computational Biology	2014, 2018

Refereeing Work

Cell; Nature Communication; Nucleic Acids Research; eLife; PNAS; Cell Reports; NPJ Syst Biol; J Biological Rhythms; Seminars in Cell and Developmental Biology; Scientific Reports; Physical Review Letters; Physical Review E; Physica D; J Theo Biol; PLoS Comp Biol; Biophys J; BMC Syst Biol; J of Biol Phys; IEEE Trans. Biomed. Circuits Syst; J Chemical Physics; Mathematical Biosciences; Bull Math Biol Phys Biol; IET Syst Biol: PLoS One; Automatica; Discrete and Continuous Dynamical Systems; Nonlinear Dynamics

Organization

2024 Society of Mathematical Biology Annual Meeting, Seoul, Korea
2022 KSIAM-NIMK Workshop for Biomatheamtics, Yeosu, Korea
2022 KSIAM Spring Meeting, Daejeon, Korea
2022 SIAM LS Mini-symposium: Biological Oscillations: From Genes to Populations, Pittsburgh, USA
2021 KSIAM Annual Meeting, Pusan, Korea
2021 Society of Mathematical Biology Annual Meeting (Local committee), UC Irvine, USA
2020 MBI Workshop on Mathematical and Computational Methods in Biology, Columbus, USA
2019 International Conference of Systems Biology, Okinawa, Japan

2019 ICIAM Mini-Symposium: CJK-SIAMs joint mini-symposium on Mathematical Biology, Valencia, Spain
2018 KSIAM Annual Meeting Mini-Symposium: Analysis for biology data: from molecules to populations, Jeju, Korea
2018 A3 Foresight Program Joint Workshop, Mathematics of Biology, Fluid Dynamics and Material Sciences, Gangneung, Korea
2018 ECMTB Mini-symposium: Multi-scale modeling and simulations of stochastic systems, Lisbon, Portugal
2018 A3 International Workshop for Mathematical and Life Sciences, Hiroshima, Japan
2017 A3-NIMS Joint Workshop on Mathematical Biology, Daejeon, Korea
2016 A3 Workshop on Interdisciplinary Research Connecting Mathematics and Biology, Pecking, China
2015 SMB Annual Meeting Mini-symposium: Approximation and simulation of multiscale stochastic system, Atlanta, USA.

Membership and Service

Public Outreach Committee of Society for Society for Research on Biological Rhythms	2021–2023
Nomination Committee of SIAM LS	2020
Applied Mathematics Committee of Korean Mathematical Society	2018–present
International Exchange Committee of Korea SIAM	2018–present
Board member of Population Approach Group in Korea	2016–present
Board Member of Korea Society for Industrial and Applied Mathematics	2015–present
Member of Korean Mathematical Society	2015–present
Member of Society of Mathematical Biology	2014–present
Member of Society for Research on Biological Rhythms	2012–present
Member of Society for Industrial and Applied Mathematics	2009–present

Teaching

Applied Analysis, Nonlinear Dynamics, Mathematical Biology, Method of Applied Math, Numerical Linear Algebra (-Present)
Instructor KAIST, Daejeon, Korea
– Received Best Teaching Award from College of Natural Sciences, KAIST

International Chronobiology Summer School (Summer 2020)
Lecturer Online
– Mentored three graduate group projects on circadian rhythms, cell cycle and neural rhythms.

European Chronobiology Summer School (Fall 2019)
Lecturer Ludwig Maximilian University, Munich, Germany
– Mentored three graduate group projects on circadian rhythms, cell cycle and neural rhythms.

MBI-CAMBAM-NIMbios Graduate Summer Program (Summer 2014)
Project mentor The Ohio State University, Columbus, OH, USA
– Mentored three graduate group projects on circadian rhythms, cell cycle and neural rhythms.

Calculus for Biological Sciences (Fall 2013)
Project mentor The Ohio State University, Columbus, OH, USA
– Mentored a undergraduate group project on parameter sensitivity analysis for five weeks.

Precalculus (Fall 2009), Calculus I (Winter 2010), Calculus II (Fall 2010/2011)
Sessional Lecturer University of Michigan, MI, USA
– Received The Department of Mathematics Outstanding Teaching Award bestowed on one graduate student in Math Department.

Calculus (2005-2008)
Mathematics Instructor Air Force Aviation Science High School, Jinju, Korea
– Prepared and implemented lectures 12 hours weekly. Developed a curriculum of calculus.
– Received Best Instructor Award bestowed on one instructor in Air Force Academy.

Mentoring

Postdoctral Fellow and Senior Researcher (current position)
Aurelio A. de los Reyes V
Hyeontae Jo
Hyun Kim
Bryan S. Hernandez

Ph.D. Student (current position)
Dae Wook Kim (Van Loo Postdoctral Fellow, U of Michigan), KSIAM Young Researcher Award, SRBR Merit Award, and Global Ph.D. Fellowship
Eumin Jung
Seokjoo Choe, TJK Park Fellowship and SMB Poster award
Hyukpyo Hong, Global Ph.D. Fellowship
Yumin Song, SMB Poster award

Master Student (current position)
Tyczynska Malgorzata Anna (Moffit Cancetr Center, FL, USA)

Undergraduate Student (current position)
Seho Park (U Wisconsin, Madison), Seokmin Ha, Minki Lee (U Michigan, Ann Arbor), Kien Hoang, Reinatt Hansel Wijaya

Invited Talks

2022	European Biological Rhythms Scoiety	Zurich, Switzland
	Europe-Korea Conference on Science and Technology	Marseille, France
	World Sleep Congress (Minisymposium)	Rome, Italy
	World Sleep Congress (Minisymposium)	Rome, Italy
	Korean Sleep Research Society Annual Meeting	Seoul, Korea
	Samsung Eletronics Seminar	Seoul, Korea
	Korea Institute of Oreiental Medicine Seminar	Daejeon, Korea
	Ewha Women's U Medical School Seminar	Seoul, Korea
	2022 SRBR Trainee Day	FL, USA
2021	Phamcast Inc. Seminar	Pusan, Korea
	KIAS Awardee Talk	Seoul, Korea
	Korea Society of Mathematical Biology Annual Meeting	Jeju, Korea
	Dept of Mathematics Seminar, Kyungpook National University	Daegu, Korea
	RIKEN Interdisciplinary Theoretical and Mathematical Sciences Program	Online
	Korean Society of Sleep Medicine	Seoul, Korea
	Samsung STF Annual Forum	Online
	Korean Society of Sleep Medicine	Online
	Dept of Mathematics Seminar, Pusan National University	Pusan, Korea
	Korean Academy of Sleep Medicine (Plenary)	Seoul, Korea
	Asia Pacific Center for Theoretical Physics Workshop	Gyeongju, Korea
	20th Human Frontier Sciences Program Awardees Meeting	Online
	KWMS The 16th International Conference (Public Lecture)	Online, Korea
	IBS Center for Cognition and Sociality Semina	Daejeon, Korea
	SMB Annual Meeting, SIAM-SMB Special Session	Online, USA
	Global Symposium Sleeping Beauty, Amore Pacific Inc.	Soeul, Korea
	Korean Society for Brain and Neural Sciences Annual Meeting	Songdo, Korea
	U of Oxford Mathematical Biology Seminar	Online, UK
	Harvad Medical School Analytic and Modeling Unit Journal Club Seminar	Online, USA
	Korean Biological Rhythm Society Symposium	Online, Korea

2020	Korean Society of Sleep Medicine Annual Meeting	Seoul, Korea
	Cell Bio ASCB/EMBO meeting	Philadelphia, USA
	Mathematical Biology & Data Science Workshop	Daegu, Korea
	International symposium on mathematical oncology	Osaka, Japan
	The Korean Society of Clinical Neurophysiology Fall Meeting (Pleanary)	Seoul, Korea
	Psychiatry seminar, Asan Medical Center	Seoul, Korea
	Harvard Medical School AMU seminar	Online
	U of Cincinnati Math Colloquium	Cincinnati, USA
	U of Michigan Applied Math Seminar	Ann Arbor, USA
2019	Vietnam Institute for Advanced Studies in Mathematics	Hanoi, Vietnam
	Center for Mathematical Modeling and Application	Tokyo, Japan
	9 European Chronobiology Summer School	Munich, Germany
	Virginia Tech Genetics, Bioinformatics, & Comp. Biology Seminar	Blacksburg, USA
	Rice U The Center for Theoretical Biological Physics Seminar	Houston, USA
	Houston U Applied Math Seminar	Houston, USA
	Rutgers U Applied Math Seminar	New Brunswick, USA
	ReaDiNet 2019 Conference	Nancy, France
	U of Michigan Biological Rhythms seminar	Ann Arbor, USA
	U of Cincinnati Applied Math seminar	Cincinnati, USA
	U of Michigan Quantitative Biology Seminar	Ann Arbor, USA
	Society of Mathematical Biology Annual Meeting	Montreal, Canada
	BIRS: Scaling Limits of Dynamical Processes on Random Graph	Oaxaca, Mexico
	Asan Medical Center Cancer Seminar	Seoul, Korea
	Global Breast Cancer Conference	Songdo, Korea
	KIAS Computational Science Colloquium	Seoul, Korea
	International Workshop on Mathematical Biology	Bohol, Philippine
2018	Seoul National U Medical Center Clinical Pharmacology Seminar	Seoul, Korea
	Korean Society of Sleep Medicine Annual Meeting	Seoul, Korea
	Korea University Mathematics Colloquium	Seoul, Korea
	Dankuk U Medical Center Neurology Ground	Chunan, Korea
	SNU Medical School Precision Medicine Symposium	Seoul, Korea
	KAIST Physics Colloquium	Daejeon, Korea
	Asan Medical Center Breast Cancer Seminar	Seoul, Korea
	A3 Foresight Program Joint Workshop Mathematics of Biology, Fluid Dynamics and Material Sciences	Gangneung, Korea
	KIAS Quantitative Life Science Workshop	Seoul, Korea
	Korea Research Institute of Chemical Technology Seminar	Daejeon, Korea
	Japanese biochemical society meeting	Kyoto, Japan
	International Conference of the Korean Society for Mole and Cell Biol	Seoul, Korea
	Seoul National Medical School Ground Round Special Lecture	Seoul, Korea
	Soon Chun Hyang University Hospital, Dept of Neurology Special Lecture	Chunan, Korea
	11th European Conference on Mathematical and Theoretical Biology	Lisbon, Portugal
	BIRS workshop: Math Approaches to Cell-Cell Communication	Banff, Canada
	18th World Congress of Basic and Clinical Pharmacology)	Kyoto, Japan
	Korea Sleep Research Society Conference	Seoul, Korea
	Korea Society of Mathematical Biology Annual Meeting (Public Lecture)	Busan, Korea
	KSIAM Spring Conference, Korea-Japan Math Bio Joint Session	Daejeon, Korea
	A3 International Workshop For Mathematical and Life Sciences	Hiroshima, Japan
	Society for Research on Biological Rhythms	Fernandina Beach, USA

	KAOS Public Lecture	Seoul, Korea
	Korea Math Society Spring Conference	Seoul, Korea
	Biomedical Science and Engineering Seminar, GIST	Gwangju, Korea
	Asian Sleep Society Conference	Seoul, Korea
	Ehwa Women's Univ Math Colloquium	Seoul, Korea
	Cognition, Sleep, Mood and Stress Distinguished Lecture	Seoul, Korea
	International Workshop on Mathematical Biology	Cebu, Phillipine
2017	International SYMCYP workshop	Busan, Korea
	Korean society for clinical pharmacology and therapeutics conference	Seoul, Korea
	Osaka Univ Biological Sciences Seminar	Osaka, Japan
	Asian Pharmacometric Conference	Kyoto, Japan
	KoreaBIOplus	Seoul, Korea
	International Conference on Mathematical Biology	Taipei, Taiwan
	Handong Univ Biology Seminar	Pohang, Korea
	Korea Research Institute of Bioscience and Biotechnology	Daejeon, Korea
	IMA Innovative Statistics and Machine Learning in Precision Medicine	Minneapolis, USA
	CMC conference: Nonlinear dynamics of many-body systems	Seoul, Korea
	18th International Conference on Systems Biology (Plenary Lecture)	Blacksburg, USA
	4th Industry Revolution Forum of the National Congress	Seoul, Korea
	Korean Sleep Research Society Conference	Seoul, Korea
	International Conference on Random Dynamical Systems	Wuhan, China
	Pharmacology Seminar, Chungnam University	Daejeon, Korea
	SIAM Conference on Applied Dynamics	Salt Lake City, USA
	Department of Chemistry Seminar, Chungang University	Seoul, Korea
	A3-NIMS Mathematical Biology Workshop	Daejeon, Korea
	Korea Mathematical Society Annual Meeting Public Lecture	Gwangju, Korea
	DIGIST Brain & Cognitive Science Seminar	Daegu, Korea
	Department of Mathematics Seminar, Busan University	Busan, Korea
	Korea University Medical School Seminar	Seoul, Korea
	World Brain Awareness Week Public Lecture	Daejeon, Korea
	Humanity and Social Science Colloquium, KAIST	Daejeon, Korea
	Inje University Medical School Seminar	Busan, Korea
	Computational Neuroscience Winter School	Pohang, Korea
	Network Seminar, U of Houston	Houston, USA
2016	APCTP Workshop on Frontiers of Physics	Pohang, Korea
	System Synthetic Agricultural Engineering Workshop	Jinju, Korea
	Mathematics Colloquium, UNIST	Ulsan, Korea
	APCTP-ICTP joint workshop: quantitative life sciences	Pohang, Korea
	Brain & Cognitive Engineering Seminar, KAIST	Daejeon, Korea
	29th Conference of the International Society for Chronobiology	Suzhou, China
	International Conference for the 70th Anniversary of Korean Math Society	Seoul, Korea
	A3 Pharmacometrics Symposium	Daejeon, Korea
	Mathematics Colloquium, POSTEC	Pohang, Korea
	Mathematics Colloquium, Yeonsei Univ	Seoul, Korea
	Signature Seminar, DUKE-NUS Medical school	Singapore
	International Conference: Patterns and Waves	Hokkaido, Japan
	World Conference of Scientist and Engineers	Seoul, Korea
	Annual Computational Neuroscience Meeting (Featured oral)	Jeju, Korea
	Mathematics Colloquium, Chungnam Univ	Daejeon, Korea

	Biological Sciences Seminar, KAIST	Daejeon, Korea
	National Science Museum public lecture	Daejeon, Korea
	Industrial & Systems Engineering Colloquium, KAIST	Daejeon, Korea
	A3 Workshop on Interdisciplinary Research Connecting Math and Biology	Beijing, China
	Mathematics Colloquium, Ajou Univ	Suwan, Korea
	Mathematics Colloquium, Seoul Nat. Univ	Seoul, Korea
	Workshop for Mathematical Biology: Recent Topics and Vision (Plenary talk)	Jeju, Korea
	MBI workshop, Interplay of stochastic and deterministic dynamics	Columbus, OH
	Applied Mathematics Seminar, Ohio State Univ	Columbus, OH
2015	Sleep Seminar, Asan Medical Center	Seoul, Korea
	Inverse problem conference	Daejeon, Korea
	Young Computational Neuroscience Workshop	Seoul, Korea
	Joint workshop of China-Japan-Korea A3 Foresight Program	Xiamen, China
	Industrial & Applied Mathematics Seminar, Konkuk Univ	Seoul, Korea
	KSIAM Annual Meeting	Pusan, Korea
	Bioinfo 2015	Seoul, Korea
	Mathematics Colloquium, Inha University	Incheon, Korea
	APTCP seminar, Asia Pacific Center for Theoretical Physics	Pohang, Korea
	NIMS Colloquium, National Institute for Mathematical Sciences	Daejeon, Korea
	National Cancer Center Seminar	Ilsan, Korea
	Joint Meeting of JSMB and CJK Colloquium on Mathematical Biology	Kyoto, Japan
	Lorentz Center workshop: Human Circadian Rhythms	Leiden, Netherlands
	Society of Mathematical Biology Annual Meeting	Atlanta, GA, USA
	U of Utah Mathematics Colloquium	Salt Lake City, UT
2014	Boston Univ. Dynamical Systems Seminar Seminar	Boston, MT
	U of Utah Biological Mathematics Seminar	Salt Lake City, UT
	Florida State U. Biological Mathematics Seminar	Tallahassee, FL
	UNIST Mathematics Colloquium	Ulsan, Korea
	KAIST Applied Mathematics Seminar	Daejeon, Korea
	Konkuk U. Mathematical Biology Seminar	Seoul, Korea
	U of Michigan Mathematics Colloquium (Sumner B. Myers Prize Talk)	Ann Arbor, MI
	Ohio State U. Undergraduate Mathematical Biology Seminar	Columbus, OH
	Virginia Tech. Genetics Bioinformatics Computational Biology Seminar	Blacksburg, VA
2013	Rutgers U. Mathematical Physics Seminar	New Brunswick, NJ
2012	Complex Systems Advanced Academic Workshop	Ann Arbor, MI
	12th Experimental Chaos and Complexity Conference	Ann Arbor, MI
	RIKEN QBiC Seminar	Kobe, Japan