

Hye Jin Park | Curriculum Vitæ

Statistical physics of ecology and evolution group,
Asia Pacific Center for Theoretical Physics, Pohang, South Korea (37673)

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Research Experience

Department of Physics, Inha University

Assistant Professor

Incheon, South Korea

2022.03.01–present

Department of Physics, POSTECH

Adjunct Professor

Pohang, South Korea

2020.09.01–2022.02.28

Asia Pacific Center for Theoretical Physics

Junior Research Group Leader

Pohang, South Korea

2020.04.01–2022.02.28

Max-Planck Institute for Evolutionary Biology

PostDoc

Plön, Germany

2016.09.01–2020.03.31

Education

Sungkyunkwan University

Ph. D. in physics

Suwon, South Korea

2011–2016

Title: Statistical physics approach to social phenomena

Advisor: Beom Jun Kim

B. Sc. in Physics

2007–2011

Research Subject

- Ecological and evolutionary dynamics
- Evolutionary game dynamics
- Computational social science
- Spin system

Publications

- [20] **Park, H. J.**, B. J. Kim, H.-C. Jeong, C. Hilbe, and M. Nowak, Vacancies in a growing habitat and the evolution of cooperation, in preparation.
- [19] Y. Gao, **Park, H. J.**, A. Traulsen, and Y. Pichugin, Evolution of irreversible somatic differentiation, *eLife* (2021), 2021;10:e66711.
- [18] J. I. Park, B. J. Kim, **Park, H. J.**, Stochastic resonance of abundance fluctuations and mean time to extinction in an ecological community, *Phys. Rev. E* 104 (2021) 024133.
- [17] **Park, H. J.**, C. S. Gokhale, and Frederic Bertels, How sequence populations persist inside bacterial

genomes, *Genetics*, (2021), iyab027.

- [16] C. S. Gokhale and **Park, H. J.**, Eco-evolutionary spatial dynamics of non-linear social dilemmas, *Advances in Dynamic Games*, (2020), 185-198.
- [15] G. B. Ayan, **Park, H. J.**, and J. Gallie, The birth of a bacterial tRNA gene by large-scale, tandem duplication events, *eLife*, (2020), 2020;9:e57947.
- [14] **Park, H. J.**, Y. Pichugin, and A. Traulsen, Why is cyclic dominance so rare?, *eLife*, (2020), 2020;9:e57857.
- [13] B. Wu, **Park, H. J.**, L. Wu, D. Zhou, Evolution of cooperation driven by self-recommendation, *Phys. Rev. E* 100 (2019) 042303.
- [12] Y. Pichugin, **Park, H. J.**, and A. Traulsen, Evolution of simple multicellular life cycles in dynamic environments, *J. Royal Soc. Interface* 16 (2019) 20190054.
- [11] **Park, H. J.**, Y. Pichugin, W. Huang, and A. Traulsen, Population size changes and extinction risk of populations driven by mutant interactors, *Phys. Rev. E* 99 (2019) 022305.
- [10] **Park, H. J.** and C. S. Gokhale, Ecological feedback on diffusion dynamics, *Royal Society Open Science* 6 (2019) 181273.
- [9] **Park, H. J.**, W. S. Jo, S. H. Lee, and B. J. Kim, Generalized Gravity Model for Human Migration, *New J. Phys.* 20 (2018) 093018.
- [8] S.-G. Yang, **Park, H. J.**, and B. J. Kim, Dynamic critical behavior of the one-dimensional XY model with long-range interaction, *Phys. Rev. E* 98 (2018) 032120.
- [7] **Park, H. J.** and A. Traulsen, Extinction dynamics from meta-stable coexistences in an evolutionary game, *Phys. Rev. E* 96 (2017) 042412.
- [6] **Park, H. J.**, B. J. Kim, H.-C. Jeong, Role of generosity and forgiveness: Return to cooperative society, *Phys. Rev. E* 95 (2017) 042314.
- [5] **Park, H. J.**, S. D. Yi, D. J. Kim, B. J. Kim, Network of likes and dislikes: Conflict and membership, *Physica A* 461 (2016) 647–654.
- [4] S. K. Baek, **Park, H. J.**, B. J. Kim, Anomalous response in the vicinity of spontaneous symmetry breaking, *Eur. Phys. J. B* 88 (2015) 127.
- [3] **Park, H. J.**, S. K. Baek, B. J. Kim, Stochastic resonance in the two-dimensional q-state clock models, *Phys. Rev. E* 89 (2014) 032137.
- [2] S. K. Baek, I. G. Yi, **Park, H. J.**, B. J. Kim, Statistics of the knockout tournament, *Scientific Reports* 3 (2013) 3198.
- [1] **Park, H. J.**, H. Sim, H.-H. Jo, B. J. Kim, Analysis of one-dimensional yut-nori game: winning strategy and avalanche-size distribution, *J. Korean Phys. Soc.* 63 (2013) 1497.

Honors

Awards: Young Statistical Physicist Award from Korea Physics Society, Daejeon, Korea, 25 April 2018

Awards: Best Poster Award from Statphys26, Lyon, France, 18-22 July 2016

Awards: Best Presentation Award from Complexity Research and Education Network, Korea, 2013

Scholarships: Lotte Scholarship (2011-2, 2012-1)

Grants

2022 April-2023 February: NRF-JSPS Bilateral Collaboration (Joint Seminar) 2022.

2020 September-2023 February: National Research Foundation of Korea(NRF) grant funded by the Korea government (MSIT).

Organizing

2021 September: Workshop "Non-equilibrium collective phenomena workshop", APCTP, Gyeongju, Korea, 2021 September 27-October 1. APCTP, Pohang, Korea, August 24-26, 2020.

2020 August: Workshop "Modeling on Ecology and Evolution", APCTP, Pohang, Korea, August 24-26, 2020.

2020 June-Present: Seminar series "Modeling on Ecology and Evolution", APCTP, Pohang, Korea, June 2020-present.

2019 September: Workshop "Evolution of interacting populations", MPI for Evolutionary Biology, Plön, Germany, September 15-17, 2019.

2018-2020: Internal meeting "Monthly Academia", MPI for Evolutionary Biology, Plön, Germany, October 2018-March 2020.

2017-2018: Internal meeting "Statistical Physics study group", MPI for Evolutionary Biology, Plön, Germany, March 2017-February 2018.

2014 May-June: Assistant organizer of public talks "Let's play with physics", Sungkyunkwan University, Suwon, South Korea, May-June 2014.

Mentoring

2019 May-August: Co-supervising internship student in MPI for Evolutionary Biology, Plön, Germany

2017 July-September: Co-supervising internship student in MPI for Evolutionary Biology, Plön, Germany

Teaching

2021 September-December: Computational science, POSTECH, South Korea

2013 September-December: Statistical physics practice, Sungkyunkwan University, South Korea

2013 March-June: Classical mechanics practice, Sungkyunkwan University, South Korea

2012 September-December: Thermodynamics practice, Sungkyunkwan University, South Korea

Invited Talks

2021 November 17-19: "Artificial selection on microbial groups", Frontiers in Theoretical Biophysics, Gyeongju, Korea.

2021 August 17-19: "Artificial group selection on a simple model", Roles of heterogeneity in non-equilibrium collective dynamics (RHINO), Pohang, Korea.

2021 July 5-7: "Emergence of cooperation", Biophysics School, virtual meeting, Korea.

2021 June 23-25: "Ecological communities from generalized Lotka-Volterra dynamics with random heterogeneous interactions", KIAS Workshop on Complex Systems and Data Science, KIAS, Seoul, Korea.

2021 June 13-17: "Extinction dynamics from meta-stable coexistences in an evolutionary game", a mini-symposium "Evolutionary Game Theory under Uncertainty" at the 2021 Annual Meeting of the Society for Mathematical Biology, virtual meeting.

2021 April 7: "How interactions shape ecological communities", colloquium at Physics Department, POSTECH, Pohang, Korea.

2021 March 1-3: "Why cyclic dominance is so rare?", Eurasian summit for models of society, virtual meeting.

2021 February 23: "Simple model on artificial group selection", colloquium at Division of Environmental Science & Engineering, POSTECH, Pohang, Korea.

2020 November 25-27: "Extinction dynamics from meta-stable coexistences in ecological systems", The 2nd workshop on stochasticity and fluctuations in small systems, Gyeongju, Korea.

2020 September 25: "Evolving ecological communities", StatPhys Monthly Meeting, Korea.

2020 September 16: "Eco-evolutionary dynamics with novel mutations", iTHEMS Biology Seminar.

2020 August: "Why cyclic dominance is so rare?", RHINO 2020 workshop, Pohang, Korea.

2019 December 3: "Eco-evolutionary dynamics with novel mutation", Complex Systems seminar, Queen Mary University, UK.

2019 November 27-28: "Eco-evolutionary dynamics with stochasticity and novel mutation", Frontiers of Physics Symposium, Asia Pacific Center for Theoretical Physics (APCTP), Pohang, Korea.

2019 October 30: "Generalized Gravity model for human migration: Marriage pattern in the past", Seminar talk, Xiamen University, Xiamen, China.

2019 October: "Marriage pattern in the past studied by generalized gravity model", Seminar talk, Gyeongnam National University of Science and Technology, Korea.

2019 July 16-19: "Extinction risk of populations driven by mutant interactors", Mini symposium in Mathematical Models in Ecology and Evolution (MMEE), Lyon, France.

2019 June 24-26: "Role of generosity and forgiveness: Return to cooperative society", Workshop-Dynamics of Interdependent Decisions, Hanse-Wissenschaftskolleg, Germany.

2019 April 10-13: "Population size and interaction structure driven by mutant interactors", Interdisciplinary Challenges in Non-Equilibrium Physics workshop, The Higgs Centre for Theoretical Physics, University of Edinburgh, Scotland.

2018 May 7: "Fate of populations in a stochastic system with mutations", Perspectives in Statistical Physics on Evolutionary Game Theory, Pukyong National University (PKNU), Busan, Korea

2017 July 10-12: "Ecological feedback on evolutionary spatial dynamics with social dilemmas",

Mini symposium in Mathematical Models in Ecology and Evolution (MMEE), London, United Kingdom.

2017 April 28: "Extinction dynamics from meta-stable coexistences", Seminar talk, Korea Institute for Advanced Study (KIAS), Seoul, Korea.

2016 May 10: "Vacancies in a growing habitat and the evolution of cooperation", Department of Evolutionary Theory, Max Planck Institute for Evolutionary Biology, Plön, Germany.

2015 August 26: "Vacancies in a growing habitat and the evolution of cooperation", Program for Evolutionary Dynamics, Harvard University, US.