

Ph.D. Youngjai Park

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Professional Careers

Senior Researcher

Feb 2025 – present.

Applied Agent Research Center, Research Division for Data Analysis,
Korea Institute of Science and Technology Information (KISTI)

Postdoctoral Researcher

Mar 2023 – Dec 2024.

Center for Neuroscience Imaging Research (CNIR), Republic of Korea

Postdoctoral Researcher

Mar 2021 – Feb 2023.

Statistical Physics of Eco-Evolutionary Dynamics (SPEED) Group,
Department of Physics, Inha University, Republic of Korea
Asia Pacific Center for Theoretical Physics (APCTP), Republic of Korea

Visiting Researcher

Sep 2020 – Feb 2021.

Statistical Physics of Ecology and Evolution Group,
Asia Pacific Center for Theoretical Physics (APCTP), Republic of Korea

Visiting Researcher

Aug 2018 – Jan 2019.

Complexity Science Group, Department of Physics and Astronomy, University of Calgary, Canada

Educations

Ph.D. in Applied Physics

Mar 2016 – Feb 2021.

Department of Applied Physics, Hanyang University, Republic of Korea

Thesis: Network stylometry in complex systems: focused on the motif structures

Thesis Advisor: Prof. Seung-Woo Son

B.Sc. in Applied Physics

Mar 2010 – Feb 2016.

Department of Applied Physics, Hanyang University ERICA Campus, Republic of Korea

Grants

NRF, Postdoctoral Research Program

Sep 2023 – Feb 2024.

Title: Study on transition dynamics of relative phase to investigate conscious/unconscious states in human brain

Center for Neuroscience Imaging Research, N Center, Republic of Korea

NRF - GRA program in Canada

Aug 2018 – Jan 2019.

Title: Motif dynamics on a growing network model for various open evolving systems

Department of Physics and Astronomy, University of Calgary, Canada

Hanyang University combined MS/Ph.D. grant

Mar 2016 – Feb 2019.

Department of Applied Physics, Hanyang University, Republic of Korea

Organizing Experiences

- **Modeling on Ecology and Evolution Workshop**, Seoul, Republic of Korea (Oct 27th – 29th, 2022). ([link](#))
 - **Workshop about social science and physics**, Deagu, Republic of Korea (Nov 29th – 30th, 2021).
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Relevant Activities

Research & Teaching Assistant

- KENTECH (Korea Institute of Energy Technology), Republic of Korea Aug 2022 – Dec 2022.
 - General Physics
- Department of Applied Physics, Hanyang University, Republic of Korea Mar 2016 – Aug 2018.
 - General Physics Lab. 1
 - Computational Physics & Applications of Computational Physics
 - Scientific Analysis and Presentation

Relevant activity

Apr 2014 – Aug 2015.

- UST research internships, Korea Electrotechnology Research Institute (KERI) & University of Science and Technology (UST), Republic of Korea (Aug 2015); KOSAF Working scholarship in KERI (Apr 2014).

Korean military service

Mar 2011 – Dec 2012.

Trainings

- 2017 NIMS Study Group with Industry, National Institute for Mathematical Sciences (NIMS) & Innovation Center for Industrial Mathematics (ICIM), Republic of Korea (Dec, 2017).
- 16th APCTP Science Communication School, Asia Pacific Center for Theoretical Physics (APCTP), Republic of Korea (Feb 2017).
- 2016 Summer Special Lecture, Korea Academy of Complexity Studies (KACS), Republic of Korea (Aug 2016).
- 2016 NIMS-SKKU MDA-TDA Summer School, National Institute for Mathematical Sciences (NIMS), Republic of Korea (Jun 2016).

Awards

- **Excellent Poster Award**, 2023 IBS CNIR workshop, Republic of Korea (Dec 2023).
 - **Best award**, 2017 KACS autumn conference, Republic of Korea (Nov 2017).
 - **Best award**, The 8th KIAS CAC Summer School, Republic of Korea (Jul 2017).
 - **Excellent Presentation Award**, 16th APCTP Science Communication School, Republic of Korea (Feb 2017).
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- **Encouragement Prize**, Best Paper Competition commemorating the 2016 International Council on Archives Congress Presidential Archives, Republic of Korea (Dec 2016).
 - **Best Poster Presentation**, 2016 KPS spring conference, Republic of Korea (Apr 2016).
 - **Excellence Award**, 2015 Applied Science Capstone Design Competition, Republic of Korea (Nov 2015).
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Publications

9. **Youngjai Park**, Cheawoon Lim, Seung-Woo Son, and Mi Jin Lee, “Structure of Pitch-Pattern Motifs in Major League Baseball”, *arXiv:2601.11904* (2025). ([link](#))
 8. Yeji Lee, Sujung Park, Hyoungkyu Kim, **Youngjai Park**, UnCheol Lee, Jeongwook Kwon, Bon-Nyeo Koo, and Joon-Young Moon, “Electroencephalogram Correlates of Delayed Emergence After Remimazolam-Induced Anesthesia Compared to Propofol”, *Anesthesia & Analgesia*. **141**(6), 1399 (2025). ([link](#))
 7. Athokpam Langlen Chanu, **Youngjai Park**, Younghwa Cha, UnCheol Lee, Joon-Young Moon, and Jong-Min Park, “EEG relative phase-based analysis unveils the complexity and universality of human brain dynamics: integrative insights from general anesthesia and ADHD”, *arXiv:2503.19924* (2025). ([link](#))
 6. **Youngjai Park**, Younghwa Cha, Hyoungkyu Kim, Yukyung Kim, Jae Hyung Woo, Hanbyul Cho, Haesung Lee, George A. Mashour, Ting Xu, UnCheol Lee, Seok-Jun Hong, Christopher Honey, and Joon-Young Moon, “Sub-Second Fluctuation between Top-Down and Bottom-Up Modes Distinguishes Diverse Human Brain States”, *bioRxiv*, **2025.03.12.642768** (2025). ([link](#))
 5. **Youngjai Park**, Takashi Shimada, Seung-Woo Son, and Hye Jin Park, “Invasion and Interaction Determine Population Composition in an Open Evolving Ecological System”, *Chaos: An Interdisciplinary Journal of Nonlinear Science* **33**, 063151 (2023). ([link](#))
 4. **Youngjai Park**, Mi Jin Lee, and Seung-Woo Son, “Motif Dynamics in Signed Directional Complex Networks”, *Journal of the Korean Physical Society* **78**, 535 (2021). ([link](#))
 3. Young Jin Kim, Sohee Lim, **Young-Jai Park**, and Seung-Woo Son, “Quantitative Analysis of K-Pop Writers’ Network by Using K-Pop Lyrics”, *New Physics: Sae Mulli* **68**, 700 (2018). ([link](#))
 2. **Young-Jai Park**, Dong Woo Kim, Seon Ho Nam, Young Jin Kim, and Seung-Woo Son, “Korean Football Stylometry by Using the Football Events Networks”, *New Physics: Sae Mulli* **68**, 642 (2018). ([link](#))
 1. **Young-Jai Park**, Young-Bin Kim, Seon-Young Jeong, Young Jin Kim, and Seung-Woo Son, “Network Analysis in Korean Presidential Speeches by Using Word2Vec”, *New Physics: Sae Mulli* **67**, 569 (2017). ([link](#))
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Presentations

- **Winning strategies emerge from the dynamics of pitching patterns in Major League Baseball**, 2025 KPS fall meeting, Gwangju, Republic of Korea (Oct 2025).
 - **Technology-Industry Concordance Table Reconstructed through Agentic AI**, 2025 KPS fall meeting, Gwangju, Republic of Korea (Oct 2025); 2025 KDMS summer conference, Pyeongchang, Republic of Korea (Aug 2025).
 - **Relationship between BOLD activity and cortico-cortical communications in simultaneous fMRI-EEG recordings of human brain**, 2024 IBS CNIR workshop, Suwon, Republic of Korea (Dec 2024); 2024 KPS fall conference, Yeosu, Republic of Korea (Oct 2024); KSBNS 2024, Gyeongju, Republic of Korea (Oct 2024).
 - **Understanding synchronization considering both the amplitude and phase of oscillators by utilizing the Stuart-Landau model**, 2024 KPS spring conference, Daejeon, Republic of Korea (Apr 2024).
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- **How to Detect the Depth of Anesthesia in Human Brain Waves Utilizing Relative Phase Dynamics**, OHBM2024, Seoul, Republic of Korea (Jun 2024); KSCBP 2024, Seoul, Republic of Korea (Feb 2024); The 4th Symposium on Biological Physics, Busan, Republic of Korea (Jan 2024); 2023 IBS CNIR workshop, Suwon, Republic of Korea (Dec 2023); 2023 KPS fall conference, Changwon, Republic of Korea (Oct 2023); KSBNS 2023, Busan, Republic of Korea (Sept 2023); ICBP 2023, Seoul, Republic of Korea (Aug 2023).
 - **What determines a shape of biomass pyramids**, MEEW 2022, Seoul, Republic of Korea (Oct 2022); 2022 KPS fall conference, Busan, Republic of Korea (Oct 2022); RHINO 2022, Tokyo, Japan (Sept 2022).
 - **Invasion and Interaction determine Population Composition in an Open Evolving System**, Frontiers in Theoretical Biophysics, Gyeongju, Republic of Korea (Nov 2021); The 21st Statistical Physics Workshop, Online, Republic of Korea (Aug 2021).
 - **Diversity and Stability on an Open Evolving Network Model**, 2020 KPS fall conference, Online, Republic of Korea (Nov 2020); 2020 MEE workshop, Online, Republic of Korea (Aug 2020).
 - **Evolving open system with Lotka-Volterra dynamics**, RHINO 2020, Online, Republic of Korea (Aug 2020); 2020 KPS spring conference, Online, Republic of Korea (Jul 2020).
 - **Motif Dynamics on Signed Directed Complex Networks**, 2019 KPS fall conference, Gwangju, Republic of Korea (Oct, 2019); The 20th Workshop for Statistical Physics, Byeonsan, Republic of Korea (Aug 2019); 2019 KPS spring conference, Daejeon, Republic of Korea (Apr 2019); Dynamics Days 2019, Evanston, United States (Jan 2019).
 - **Football Stylometry with Football Event Network Analysis**, 2017 KACS autumn conference, Seoul, Republic of Korea (Nov 2017); Korean society of Science & Football, Seoul, Republic of Korea (Jun 2017).
 - **Motifs dynamics on a network model of evolving open system**, 2017 KPS fall conference, Gyeongju, Republic of Korea (Oct 2017); The 2nd Workshop on Self-Organization and Robustness of Evolving Many-Body Systems, Sapporo, Japan (Sept 2017).
 - **Microscopic network structures on a model of evolving open system**, The 19th Workshop for Statistical Physics, Mungyeong, Republic of Korea (Aug 2017).
 - **Growth conditions on a model of evolving open system**, 2017 KPS spring conference, Daejeon, Republic of Korea (Apr 2017).
 - **Network analysis in various systems**, Mini-Workshop on Social Modeling and Simulation and Hands-on Tutorial of OACIS, Kobe, Japan (Mar 2017).
 - **Network analysis in Korean presidential speeches by using Word2Vec**, 2016 KACS autumn conference, Seoul, Republic of Korea (Nov 2016); NSPCS16, Hoegi, Republic of Korea (Jul 2016).
 - **Chronological Changes in the Spoken Word Networks of Korean Presidents**, NetSci2016, Seoul, Republic of Korea (May 2016); 2016 KPS spring conference, Daejeon, Republic of Korea (Apr 2016).
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