JUNGMIN KIM, PH.D.

Research Associate
Department of Electrical and Computer Engineering
University of Wisconsin–Madison, Madison, WI 53706, USA

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PERSONAL INFO

South Korean citizen, J-1 Research Scholar in the United States, Born in 1993

EDUCATION

Ph.D. in Electrical and Computer Engineering — Feb 2023
Seoul National University — Seoul, South Korea
Advisor: Prof. Namkyoo Park & Prof. Sunkyu Yu

B.S. in Electrical and Computer Engineering — Feb 2017
Seoul National University — Seoul, South Korea

PROFESSIONAL EXPERIENCES

University of Wisconsin-Madison — Madison, WI, United States
Research Associate — Apr 2023 – Present
Conducted research on various topics of optical computing: visual perception application, hardware design, and 3D face recognition with neuromorphic metasurfaces.

Seoul National University — Seoul, South Korea
Research Assistant — Mar 2017 – Feb 2023
Conducted research on band engineering in photonic ordered and disordered systems.
Photonic Systems Laboratory & Intelligent Wave Systems Laboratory

Teaching Assistant — Mar 2017 – Feb 2023
ECE202B: Introduction to Electromagnetism (Fall 2018, 2019, 2020);
ECE326: Applied Quantum Mechanics (Spring 2018, 2019);
ECE832A: Nanophotonics (Spring 2018)

RESEARCH INTERESTS

Main field: **Photonics**
Present focus: **Optical computing theory and simulation**

PUBLICATIONS

Preprints

- Dissertation: J. Kim, "*Manipulating Spatiotemporal Degrees of Freedom for Photonic Switching Devices: Theoretical and Machine-Learning Approaches*," Seoul National University (Feb 2023). [pdf]
- J. Kim,[†,*] Q. Zhou,[†,*] and Z. Yu, Photonic systolic array for all-optical matrix-matrix multiplication, arXiv:2410.21671 (2024).

Peer-Reviewed Articles

[8] J. Kim,[*] N. Yu, and Z. Yu, Compute-First Optical Detection for Noise-Resilient Visual Perception, ACS Photonics (2025). [arXiv]

[7] J. Kim,[†] J.-Y. Kim,[†] J. Kim, Y. Hyeong, B. Neseli, J.-B. You, J. Shim, J. Shin, H.-H. Park, and H. Kurt,[*] Inverse design of nanophotonic devices enabled by

optimization algorithms and deep learning: recent achievements and future prospects, Nanophotonics (2025).

[6] J. Kim, D. Lee, S. Yu,* and N. Park,* Unidirectional scattering with spatial homogeneity using correlated photonic time disorder, Nature Physics 19, 726 (2023).

[5] S. Oh, J. Kim, X. Piao, S. Kim, K. Kim, S. Yu, and N. Park,* Control of localization and optical properties with deep-subwavelength engineered disorder, Optics Express 30, 28301 (2022).

[4] S. Choi,† J. Kim,† J. Kwak, N. Park,* and S. Yu,* Topologically Protected All-Optical Memory, Advanced Electronic Materials 8, 2200579 (2022). [cover]

[3] J. Kim, S. Park, S. Yu,* and N. Park,* Machine-Engineered Active Disorder for Digital Photonics, Advanced Optical Materials 10, 2102642 (2022). [cover]

[2] S. Park,† I. Lee,† J. Kim, N. Park,* and S. Yu,* Hearing the shape of a drum for light: isospectrality in photonics, Nanophotonics 11, 2763 (2022).

[1] J. Kim, S. Yu,* and N. Park,* Universal Design Platform for an Extended Class of Photonic Dirac Cones, Physical Review Applied 13, 044015 (2020).

† Equal contribution; * Corresponding author(s)

PRESENTATIONS

Talks

[2] J. Kim, Metalens design for noise resilience in machine visual perception, Seoul National University, Seoul, Korea (2024).

[1] J. Kim, S. Yu, and N. Park, Neural-network-based design of tunable multilayer films, GoGE/SDG Session on Electro-Physics, e-TEC Talks@SNU Summer 2021, virtual (2021).

Conferences

[11] J. Kim, N. Yu, and Z. Yu, Incoherent meta-imaging system for noise-robust object recognition, CLEO-PacificRim 2024, Mo1A-4, Incheon, Korea (2024).

[10] D. Lee, J. Kim, H. Park, I. Lee, S. Yu, and N. Park, Design of Correlated Photonic Time Disorder for Unidirectional Scattering, Advanced Photonics Congress 2023, NoTu3C.4, Busan, Korea (2023).

[9] D. Lee, J. Kim, N. Park, and S. Yu, Molecular Dynamics for Microscopic Analysis of Refractive Index in Amorphous Hafnium Oxides, Frontiers in Optics 2022, FW5C.5, Rochester, NY, USA (2022).

[8] J. Kim, S. Park, Dayeong Lee, S. Yu, and N. Park, Data-Driven Engineering of Active Photonic Disorder, Frontiers in Optics 2022, JW4A.20, Rochester, NY, USA (2022).

[7] J. Kim, S. Yu, and N. Park, Neural-network-based design of tunable multilayer films, OSA Advanced Photonics Congress, JW4B.3, virtual (2021).

[6] J. Kim, S. Park, I. Lee, S. Yu, and N. Park, Design of Multilayer-based Active Photonic Devices using Artificial Neural Networks, Photonics Conference, F2B-II.02, Pyeongchang, Korea (2021)

[5] J. Kim, S. Yu, and N. Park, Design of type-II photonic Dirac cone near Gamma point, A3 Metamaterials Forum, Sapporo, Japan (2019).

[4] J. Kim, S. Yu, and N. Park, Classification of deformed photonic Dirac cones, META, Lisbon, Portugal (2019).

[3] J. Kim, S. Yu, and N. Park, Inverse design of deformed photonic Dirac cone, OSK Winter meeting, Hoengseong, Korea (2019).

[2] J. Kim, S. Yu, and N. Park, Crystal-like Momentum in a Designed Disordered Medium, OSK Winter meeting, Gwangju, Korea (2018).

[1] J. Kim, S. In, and N. Park, Metasurface Back Reflectors for High-Efficiency Organic Solar Cells, OSK Summer meeting, Busan (2016).

PATENTS

[1] Topologically-protected all-optical memory, KR #10-2624621 (Jan 2024).

HONORS & AWARDS

- Distinguished PhD Dissertation Award, ECE, SNU. Feb 2023
- Best Poster Award, OSK Winter Meeting. Feb 2019
- National Science & Engineering Undergraduate Scholarship funded by Korea Student Aid Foundation. 2014–2016

ACADEMIC SERVICES

- Reviewer of:
  Optics Express, Optics Letters, Photonics Research, Optica, Nature Communications, ACS Photonics

SKILLS & LANGUAGES

- Numerical tools and methods: Numpy, MATLAB (TMM, PWEM, Optimizations, etc.); COMSOL Multiphysics (FEM)
- Deep learning framework: PyTorch
- Languages: Korean (native), English (proficient)

Last update on February 6, 2025.