Junho Park

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Education

University of Michigan, Ann Arbor Aug 2025 – May 2030 (Expected)
Ph.D. in Electrical & Computer Engineering *Ann Arbor, MI*

- **Focus Area:** Photonic Integrated Circuits, Photonics Design w/ & for *Machine Learning*, Inverse Design
- **Distinctions:** First-year Departmental Fellowship

University of California, Berkeley Aug 2021 – May 2025
B.S. (Honors) in Electrical Engineering & Computer Science / Materials Science & Engineering *Berkeley, CA*

- **Distinctions**: EECS Honors, Blumenkranz Research Fellowship, Dean's List, Elain Shen Award
- **Relevant Coursework**: PHYS 141A (Condensed Matter Physics); MSE 111 (Electronic Materials); MSE 102 (Crystallography); MSE 103 (Phase Transformations); MSE 104 (Material Characterization); MSE 125 (Thin Films); PHYS 137A (Quantum Mechanics); EE 105 (Microelectronics); EE 140 (Linear Integrated Circuits); EE 118 (Optical Engineering); EE 117 (Electromagnetism)

Experience

STMicroelectronics Jan. 2025 – May. 2025
Modeling & Characterization Intern *Santa Clara, CA*

- Characterized VCSELs (Vertical Cavity Surface Emitting Laser) for **high-speed optical interconnect** applications, performing end-to-end analysis of beam divergence, modal distributions, output power stability, and high-frequency modulation waveforms relevant to data-center links.
- Designed optical test platforms and developed Python and LabVIEW automation pipelines to accelerate laser performance evaluation and reliability screening for **next-generation data-center photonic modules.**

Apple Jan. 2024 – Aug. 2024
Material Material Engineering Intern *Cupertino, CA*

- Conducted DOE's with vendors to improve ceramic material strength by establishing correlations between microstructure, material properties and strengths using SEM, TEM, diffraction analysis and Differential Scanning Calorimetry
- Implemented spectroscopic techniques to enhance in-house quality measures for material performance assessment; ***Shipped in iPhone Air***

Amazon Web Services Jun. 2023 – Aug. 2023
Software Development Engineer Intern - Amazon Go: Just Walk Out Tech *Seattle, WA*

- Re-architected and developed computer vision aided kiosk-customer interaction workflow that manages proper receipt generation and checkout procedure for customers at Amazon Go stores using Java and Kotlin
- Deprecated Coral API and developed 3 new components that queries DynamoDB tables, S3 buckets and SQS for cost reduction

University of California, Berkeley Aug. 2022 – Present
Reader for MSE 45: Intro to MatSci & MSE 125: Thin-Film Material Science *Berkeley, CA*

- Supported student learning by clarifying foundational and advanced materials science concepts, including atomic structure, bonding, mechanical properties, and thin film deposition techniques.
- Reviewed and graded homework, quizzes, and lab reports to provide constructive feedback and enhance analytical skills.

Javey Research Group @ UC Berkeley Aug. 2021 – Jun. 2023
Optoelectronics Researcher *Berkeley, CA*

- Fabricated multiplexed, more efficient and stable optoelectronic devices with emission spectrum from infrared to ultraviolet wavelength through e-beam evaporation, photolithography, and chemical vapor deposition; advised by Professor Ali Javey
- Built 7 by 7 arrays of electroluminescent metal oxide semiconductor capacitor, testing different solution-processable electroluminescent materials and its imaging capabilities

Ager Research Group @ Lawrence Berkeley National Lab Jun. 2022 – Aug. 2022
Computational Researcher & Blumenkranz Research Fellow *Berkeley, CA*

- Constructed a 1D gas interdiffusion model that accurately describes the diffusion behaviors of Argon and Carbon Monoxide in finite lengths of tube and different thicknesses of carbon papers using python; advised by Prof. Joel Ager
- Modeled electrochemical reduction of Carbon Monoxide on Cu catalyst surface using Kinetic Monte Carlo simulation

University of California, Santa Barbara Jun. 2020 – Aug. 2020
Materials Science Researcher *Santa Barbara, CA*

- Developed a MATLAB script to predict composite behaviors under thermomechanical loading using Classical Lamination Theory
- Utilized Onshape and Simscale to design, simulate and observe composite behaviors via Finite Element Method and compare with Classical Lamination Theory; advised by Dr. Behnam Ahmadikia; won Best Paper at IEEE IEMENTech

Publications

AAAI: Towards Explainable Inverse Design for Photonics via Integrated Gradients. **J. Park**, T. Kim, S. Nam, AAAI XAI4Science Workshop, 2025. DOI: 10.48550/arXiv.2510.22176

Science Advances: Highly multicolored light-emitting arrays for compressive spectroscopy. V. Wang, S. Z. Uddin, **J. Park**, A. Javey, 9, eadg1607, 2023. DOI: 10.1126/sciadv.adg1607

ACS Catalysis: Importance of Site Diversity and Connectivity in Electrochemical CO Reduction on Cu. C. Kim, N. Govindarajan, S. Hemenway, **J. Park**, A. Zoraster, et al., ACS Catalysis 2024 14 (5), 3128-3138. DOI: 10.1021/acscatal.3c05904

IEEE IEMENTech: Accuracy Analysis of Classical Lamination Theory and Finite Element Method for Fiber Reinforced Composites under Thermomechanical Loading. **J. Park**, B. Ahmadikia. DOI: 10.1109/IEMENTech51367.2020.9270119

IEEE ICACI: Generating high-resolution climate change projections using super-resolution convolutional LSTM neural networks. C. Chou, **J. Park**, E. Chou. DOI: 10.1109/ICACI52617.2021.9435890

IEEE IAEAC: Predicting stock closing price after COVID-19 based on sentiment analysis and LSTM. C. Chou, **J. Park**, E. Chou. DOI: 10.1109/IAEAC50856.2021.9390845

IEEE IAEAC: Predicting stock closing price after COVID-19 based on sentiment analysis and LSTM. C. Chou, **J. Park**, E. Chou. DOI: 10.1109/IAEAC50856.2021.9390845

IEEE IREC: Investigation on Addition of Neodymium Magnets in Hydrometallurgical Citric Acid Leaching of Rare Metals from Spent Lithium-ion Cells. **J. Park**. DOI: 10.1109/IREC48820.2020.9310397

IEEE IREC: An In-depth Study of Optimization of Glass-Epoxy Unidirectional Fiber-Reinforced Laminated Composites Under Mechanical Loading. **J. Park**, C. Chou DOI: 10.1109/ICMIMT52186.2021.9476217

***Under Review at Conference on Laser and Electro-Optics*:** Etch-Free Integrated III-Nitride Photonics via Bottom-Up Selective-Area Growth. M. He, **J. Park**, Y. Guo, O. Alkhazragi, J. Liu, L. Cui, T. B. Norris, Z. Mi, D. Liang

Projects

Radiation-Robust PIC Component for Space Photonics Circuit Application
University of Michigan

- Designed and executed ion-irradiation and extreme-temperature test campaigns on bottom-up SAG-grown GaN microring resonators using MIBL and MiHTEE facilities, following ECSS and NASA GEVS frameworks to emulate space and harsh-environment conditions.
- Characterized pre-/post-exposure optical performance (resonance wavelength, FSR, Q_L/Q_i, extinction ratio, mode splitting, propagation loss) and physical changes (AFM/SEM, Raman, TEM/XRD) to quantify defect formation and reliability of III–N photonic devices under displacement damage and thermal cycling.

III–N Photonics for Low-Loss On-Chip Interconnects

University of Michigan

- Fabricated low-scattering III–N waveguides and microring resonators using bottom-up selective-area MBE growth, achieving smoother sidewalls and reduced optical loss for **dense optical interconnect architectures.**
- Characterized C-band microring performance to extract quality factors, group index, and propagation loss, demonstrating a platform suitable for high-reliability, wide-band PICs relevant to **next-generation data-center systems.**

Interpretable Inverse Design of Photonic Components for WDM Data-Center Links

University of Michigan

- Developed an interpretable inverse-design framework for wavelength-demultiplexing components used in high-bandwidth data-center optics, combining neural-network surrogates with Integrated Gradients to identify geometry most critical to 1300/1550 nm transmission.
- Generated pixel-level sensitivity maps that guide fabrication-aware optimization, enabling more robust and scalable design of compact WDM components for **silicon-photonics-based data-center interconnects.**

LCD Driver Amplifier Design for a Smartwatch Display

EE 140 Project

- Designed a low-power, high-precision amplifier for an LCD display driver using telescopic cascode and Class AB amplifier topologies, achieving 1.4V output swing, 0.2% error, and 2.5mW power consumption for a 272 x 340 smartwatch pixel array using Cadence Virtuoso & Layout.
- Optimized the design for stability, phase margin, and power efficiency, meeting stringent performance requirements for high-speed pixel voltage updates at a 60Hz refresh rate.

Chirped Pulse Amplification: Simulation and Theoretical Analysis

EE 118 Project

- Developed and Delivered Theoretical Content: Created comprehensive introduction and theory slides for a group project on Chirped Pulse Amplification, effectively explaining CPA principles, amplification mechanisms, and applications
- Integrated Simulation Insights: Collaborated with team members to incorporate MATLAB simulation results into the theoretical framework, enhancing the presentation's depth and demonstrating practical applications of CPA in high-intensity laser systems.

3D-Printed Complex Geometries for Broadband Matching Layers in Acoustic Transducers

MSE 137 Capstone Proejct

- Designed and 3D-printed complex geometrical matching layers for acoustic transducers, optimizing broadband performance across 20 kHz to 150 kHz frequencies in aqueous environments.
- Conducted performance evaluations and material selection to enhance impedance matching, leveraging additive manufacturing to simplify fabrication and improve transducer versatility.