Gayoung Park

She/her/hers | Cambridge, MA | +1 (857)331-8085 | gypark@mit.edu | LinkedIn

Education

Massachusetts Institute of Technology, Cambridge, MA — Sep. 2025 — Present
Ph.D. in Electrical Engineering and Computer Science (*Advisor: David J. Perreault*) — Cumulative GPA: 5.00/5.00

Seoul National University, Seoul, South Korea — Mar. 2023 — Feb. 2025
M.S. student in Electrical and Computer Engineering (*Advisor: Shenghui Cui*) — GPA: 4.02/4.3
Thesis: Optimization of Modulation Scheme and Transformer Design of Dual-Active Bridge Converter for Improved Efficiency

Seoul National University, Seoul, South Korea — Mar. 2018 — Feb. 2023
B.S. in Electrical and Computer Engineering (Honors: *Summa cum laude*) — GPA: 3.93/4.3

Experiences

1-MHz High-Step-Down LLC Converter for EV Applications — Sep. 2025 — Present
Graduate Student Researcher, MIT — *Cambridge, MA*

- Designed and optimized high-frequency magnetics and control strategies for a 1-MHz high-step-down LLC converter targeting EV low-voltage DC-DC systems (PLECS, LTspice, Ansys, Altium).

40 kW Isolated Dual-Active-Bridge DC-DC Converter for EV Fast Charger — Sep. 2023 — Feb. 2025
Graduate Student Researcher, Seoul National University (Collab. with LG Innotek) — *Seoul, South Korea*

- Designed and experimentally validated a high-density SiC-based 40 kW dual-active-bridge converter prototype for a bidirectional EV fast charger, achieving a peak efficiency of 98.8%.
- Developed a nonlinear optimization-based modulation scheme to maximize the ZVS range while minimizing RMS current — first-author, *IEEE Trans. Power Electron.*, Jul. 2025.

Grid-Forming Control and Fault-Ride-Through Design for Inverter-Based Resources — Jan. 2023 — Sep. 2024
Graduate Student Researcher, Seoul National University (Collab. with KEPCO Research Institute) — *Seoul, South Korea*

- Designed and validated a mixed-signal closed-loop controller board featuring a TI TMS320F28379D MCU, SPI, DACs, ADCs, PWM outputs, and hardware fault protection.
- Constructed a Typhoon HIL (Hardware-in-the-Loop) testbed to validate grid-forming control for 3-level VSCs.
- Formulated fault-ride-through and current-limiting strategies, and developed an online nonlinear optimization-based power-voltage control method to enhance stability in weak grids — first-author, *IEEE APEC 2024*.

3.2 kW Titanium Plus Power Supply for Data Center Applications — Sep. 2022 — Feb. 2023
Undergraduate Student Researcher, Seoul National University (Collab. with LG Innotek) — *Seoul, South Korea*

- Contributed to the hardware design of a SiC/GaN totem-pole bridgeless PFC stage for 80 PLUS Titanium data-center power supplies; analyzed advanced modulation schemes and empirical efficiency data.

Gate Driver Circuit Design for 3-Phase 2-Level Voltage Source Converter — Feb. 2022 — Jun. 2022
Exchange Undergraduate Student Researcher, École Polytechnique Fédérale de Lausanne (EPFL) — *Lausanne, Switzerland*

- Designed a gate-driver board incorporating isolated voltage sensing and controller interfaces for a 2-level VSC.

HDMI Retimer Circuit Development for Video Display — Jan. 2021 — Feb. 2021
Intern, Samsung Electronics — *Suwon, South Korea*

- Designed a mixed-signal repeater board integrating HDMI signal equalization and LDO-based power management circuits (Cadence OrCAD).

Technical Skills

- **Hardware design and testing**: schematic capture and PCB layout (Altium, KiCad); circuit simulation (LTspice, PLECS); magnetics design (Ansys); thermal design; prototype bring-up, test, and debug
- **Embedded control and simulation**: C/C++ firmware development for real-time control (TI C2000 MCUs, Code Composer Studio); Python (PyTorch, TinyML); MATLAB/Simulink; hardware-in-the-loop testing (Typhoon HIL)

Publications

Journal Articles

1. J. Maeng, J. Ham, G. Park, J. Park, H. Wu, J.-J. Jung and S. Cui, "A Supercapacitor Size Minimization and Energy Management Strategy for E-STATCOM Connected to Weak Grid," in *International Journal of Electrical Power and Energy Systems*, vol. 172, 2025, pp. 111174, ISSN 0142-0615, doi: 10.1016/j.ijepes.2025.111174.
2. G. Park, H. Kim, B.-K. Cho and S. Cui, "ZVS-Enhanced and RMS-Current-Minimized Optimal Modulation Scheme of Dual-Active Bridge Converter with Comprehensive ZVS Analysis," in *IEEE Transactions on Power Electronics*, vol. 40, no. 7, pp. 9004-9018, July 2025, doi: 10.1109/TPEL.2025.3541847.
3. C. Im, J. Ham, J. Maeng, G. Kim, S. H. Park, J. Kim, J. Lee, G. Park, J. T. Lee, K. Choi, U. Bong, S. Cui, S. Hahn and S. Lee, "Nonlinear Characteristics of Metal-Insulated REBCO Magnet Under Various Switching Frequencies of Half-Bridge Inverter Circuit," in *IEEE Transactions on Applied Superconductivity*, vol. 34, no. 5, pp. 1-6, Aug. 2024, Art no. 4604906, doi: 10.1109/TASC.2024.3370092.

Conference Papers

1. G. Park and D. J. Perreault, "Design Optimization of a 1-MHz Planar Transformer for a High-Power-Density and High-Step-Down-Ratio LLC Converter," *2026 IEEE 26th Workshop on Control and Modeling for Power Electronics (COMPEL)*, Cambridge, UK, 2026, *Accepted*.
2. G. Park, H. Kim and S. Cui, "Optimization of Transformer Design Parameters of a 20 kW SiC-Based Dual-Active Bridge Converter for Enhanced Efficiency," *2024 IEEE Energy Conversion Congress and Exposition (ECCE)*, Phoenix, AZ, USA, 2024, pp. 3034-3039, doi: 10.1109/ECCE55643.2024.10861215.
3. G. Park, J. Park, S. Cui and S. -K. Sul, "Nonlinear Optimization-Based Power-Voltage Control of Grid-Connected Converter in Weak Grid," *2024 IEEE Applied Power Electronics Conference and Exposition (APEC)*, Long Beach, CA, USA, 2024, pp. 228-233, doi: 10.1109/APEC48139.2024.10509166.
4. G. Park and S. Cui, "Current Limiting FRT Strategy of Grid-Forming Converter," *2023 Korean Institute of Power Electronics (KIPE) Power Electronics Conference*, pp. 74-76, Jul. 2023. (in Korean)

Honors & Awards

Ph.D. Study-Abroad Scholarship, Korea Foundation for Advanced Studies (KFAS) Fall 2024 — Present
Annual research grant supporting Ph.D. studies (up to 5 years)
(Selected as one of 4 recipients in Electrical Engineering in 2024)

Domestic Graduate Scholarship, SBS Cultural Foundation Fall 2023 — Fall 2024
Full tuition and monthly research grant for promising graduate students
(Selected as one of 9 recipients in 2023)

SNU Tomorrow's Engineers Membership (STEM) Spring 2021 — Spring 2022
Honor society for engineering students demonstrating excellence in academic achievements

Yangyoung Foundation Scholarship Spring 2020 — Fall 2021
Full tuition support for undergraduate students with outstanding academic performance

Academic Excellence Scholarship Spring 2018
Full-ride scholarship awarded for academic excellence

Hanseong Son Jae-han Scholarship 2016 — 2017
Research grant for high school students with exceptional potential in scientific research

Korean Physical Society's Physics Camp for High School Girls Summer 2015
2nd place, *Topic: Piezoelectric energy harvesting soccer ball*
Poster presentation at the 2015 KPS Fall Meeting

Selected Course Projects

Temperature Estimation of SiC MOSFETs based on Temperature-Sensitive Optical Parameters Fall 2022
Course: Power Semiconductor Devices

- Designed a light-receiving circuit considering the luminescence intensity profile of SiC MOSFETs.
- Assisted with experimental measurements of luminescence intensity and temperature under different operating currents.

1 kW BLDC Motor Control for Driving an Electric Scooter Fall 2021
Course: Design Project for Electrical Devices and Systems

- Designed a control system using the TMS320F28379D MCU and a 3-phase 2-level voltage source inverter for driving an 1 kW BLDC motor powered by a 48 V battery.

Other Experiences

Teaching Assistant, Seoul National University

- Selected Research Topics in Power Electronics — Fall 2024
- Seminar on Electric Energy Conversion and Circuits for M.S. Students — Spring 2024
- Design Project for Electrical Devices and Systems: Motor Drive for Electric Scooters — Spring 2023, Fall 2023
- Introduction to Circuit Theory and Laboratory — Spring 2023

Volunteer Experience, Seoul National University

- **Mentor for STEM Vision Mentoring Program** — Summer 2021
  — *Guidance and roadmap exploration for high school students*
- **Mentor for AI Tech Play** — Spring 2021
  — *AI education program for middle school students*
- **Service Award** — Summer 2019
  — *Recognized for outstanding dedication and contributions to the E&CE student council*
- **Volunteer at Summer Engineering Camp** — Summer 2019
  — *Engineering workshops for elementary school students*
- **Mentor for Dream Camp** — Winter 2018
  — *Roadmap exploration mentoring for high school students in underprivileged areas*

Languages

Korean (Native), **English** (Professional working proficiency)