Kyunghwan Choi

Assistant Professor, CCS Graduate School of Mobility, Korea Advanced Institute of Science and Technology
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Research Interests

Multi-level Optimal Control of Connected, Automated, and Electrified Vehicles (CAEVs)

- **Component-level:** Optimal control of electric motors and drives
- **Vehicle-level:** Optimal control of vehicle dynamics and powertrain systems
- **Network-level:** Cooperative driving, predictive energy and thermal management

Optimal and Learning-based Control

- Model Predictive Control (MPC): Learning-based MPC, Computationally efficient MPC
- Neuro-adaptive Control (NAC): NAC with stability and constraint guarantees
- Reinforcement Learning (RL): Online RL-based control, Constrained RL

Education

Korea Advanced Institute of Science and Technology (KAIST) — *Daejeon, Korea*

Ph.D., Mechanical Engineering — *Feb 2020*

- **Thesis:** Real-time Optimal Torque Control of Permanent Magnet Synchronous Motors
- **Advisor:** Prof. Kyung-Soo Kim

M.S., Mechanical Engineering — *Feb 2016*

- **Thesis:** Electrotactile Sensory Feedback for Myoelectric Forearm Prostheses
- **Advisor:** Prof. Kyung-Soo Kim

B.S., Mechanical Engineering, *magna cum laude* — *Feb 2014*

Professional Experience

Korea Advanced Institute of Science and Technology (KAIST) — *Daejeon, Korea*

Assistant Professor, Cho Chun Shik Graduate School of Mobility — *May 2025 - Present*

Gwangju Institute of Science and Technology (GIST) — *Gwangju, Korea*

Adjunct Professor, AI Graduate School — *Sep 2022 - May 2025*

Assistant Professor, Department of Mechanical and Robotics Engineering — *Mar 2022 - May 2025*

Korea Advanced Institute of Science and Technology (KAIST) — *Daejeon, Korea*

Research Assistant Professor, Research Center for Eco-Friendly & Smart Vehicles — *Jan 2021 - Feb 2022*

Postdoctoral Fellow, Research Center for Eco-Friendly & Smart Vehicles — *Mar 2020 - Jan 2021*

Publications

*Corresponding author

Under Review

8. D. Hong and **K. Choi***, "Integral Error-Based Adaptive Neural Identifier for a Class of Uncertain Nonlinear Systems," Under review for *ICCAS 2025*.
7. H. Lee, **K. Choi***, and W. Kim*, "Using Deep Reinforcement Learning for Dynamic Gain Adjustment of a Disturbance Observer," Under review for *ICCAS 2025*.
6. H. Lee and **K. Choi***, "Online Actor Critic Learning for Optimal Tracking in Servo Positioning Systems," Under review for *IECON 2025*.
5. Y. Jeong and **K. Choi***, "LMI-based Neural Network Observer for State and Nonlinearity Estimation," Under review for *IECON 2025*.
4. S. Jang, M. Ryu, and **K. Choi***, "Physics-Informed Online Learning of Flux Linkage Model for Synchronous Machines," Under review for *IECON 2025*.
3. M. Ryu, N. Monzen, P. Seitter, **K. Choi**, and C. Hackl*, "Constrained Optimization-Based Neuro-Adaptive Control (CONAC) for Synchronous Machine Drives Under Voltage Constraints," Under review for *IECON 2025*.
2. G. Park, **K. Choi**, and D. Kum*, "Synthesis of a Link-Level Energy-Time Predictor Toward the Implementation of a Link-based Predictive EMS," Under review for *IEEE Transactions on Vehicular Technology*.
1. M. Ryu, D. Hong, and **K. Choi***, "Constrained Optimization-Based Neuro-Adaptive Control (CONAC) for Uncertain Euler-Lagrange Systems Under Weight and Input Constraints," Under review for *IEEE Transactions on Cybernetics*.

Journal Papers

21. G. Park, **K. Choi**, M. Kim, E. Cho, K. Sung, and D. Kum*, "Development of a real-time link-based predictive energy management strategy for extending FCEV lifespan using an experiment-driven degradation model," *Applied Energy*, Accepted.
20. **K. Choi***, S. Shin, and M. Seo, "Cooperative Merging in Mixed Traffic Based on Strategic Influence of Connected Automated Vehicles on Human-Driven Vehicle Behavior," *Advanced Intelligent Systems*, Early Access.
19. G. Park, **K. Choi**, and D. Kum*, "Predictive Control of a Dog-clutch Transmission via a Transformer-based Velocity Prediction," *IEEE Transactions on Vehicular Technology*, vol. 74, no. 5, pp. 7430-7443, 2025.
18. **K. Choi**, J. Kim, and K.-B. Park*, "Generalized Model Predictive Torque Control of Synchronous Machines," *IEEE/ASME Transactions on Mechatronics*, Early Access.
17. **K. Choi**, G. Park, and D. Kum*, "An Analytical Approach to the Predictive Energy Management of Connected HEVs: What Information Do We Need to Guarantee Global Optimality?," *IEEE Transactions on Intelligent Transportation Systems*, vol. 25, no. 9, pp. 12749-12761, 2024.
16. W. Kim, K. Na, and **K. Choi***, "A Current Sensor Fault-detecting Method for Onboard Battery Management Systems of Electric Vehicles Based on Disturbance Observer and Normalized Residuals," *International Journal of Control, Automation, and Systems*, vol. 21, no. 11, pp. 3563-3573, 2023.
15. M. Choi, **K. Choi**, M. Cho, M. Lee, and K.-S. Kim*, "Chattering Reduction of Sliding Mode Control via Nonlinear Disturbance Observer for Anti-Lock Braking System and Verification with CarSim Simulation," *International Journal of Automotive Technology*, vol. 24, no. 4, pp. 1141-1149, 2023.
14. **K. Choi** and W. Kim*, "Real-time Predictive Energy Management Strategy for Fuel Cell-powered Unmanned Aerial Vehicles Based on the Control-oriented Battery Model," *IEEE Control Systems Letters*, vol. 7, pp. 943-948, 2022 (The contents of this paper were also selected by ACC 2023 Program Committee for presentation at the Conference).
13. W. Kim and **K. Choi***, "Current Sensorless State of Charge Estimation Approach for Onboard Battery Systems with an Unknown Current Estimator," *Journal of Energy Storage*, vol. 52, pp. 104726, 2022.
12. **K. Choi**, Y. Kim, S.-K. Kim*, and K.-S. Kim*, "Computationally Efficient Model Predictive Torque Control of Permanent Magnet Synchronous Machines Using Numerical Techniques," *IEEE Transactions on Control Systems Technology*, vol. 30, no. 4, pp. 1774-1781, 2022.
11. **K. Choi**, J. Byun, S. Lee, and I. G. Jang*, "Adaptive Equivalent Consumption Minimization Strategy (A-ECMS) for the HEVs with a Near-optimal Equivalent Factor Considering Driving Conditions", *IEEE Transactions on Vehicular Technology*, vol. 71, no. 3, pp. 2538-2549, 2022.
10. J. H. Kim, **K. Choi**, and I. G. Jang*, "Model-Predictive-Control-based Time-optimal Trajectory Planning of the Distributed Actuation Mechanism Augmented by the Maximum Performance Evaluation," *Applied Sciences*, vol. 11, No. 16, pp. 7513, 2021.
9. J. Byun and **K. Choi***, "Effects Analysis of Light-duty Diesel Truck Hybrid Conversion Depending on Driving Style," *Transportation Research Part D: Transport and Environment*, vol. 97, pp. 102958, 2021.
8. **K. Choi**, Y. Kim, K.-S. Kim*, and S.-K. Kim*, "Real-time Optimal Torque Control of Interior Permanent Magnet Synchronous Motors Based on a Numerical Optimization Technique," *IEEE Transactions on Control Systems Technology*, vol 29, no. 4, pp. 1815-1822, 2021.
7. **K. Choi**, Y. Kim, S.-K. Kim*, and K.-S. Kim*, "Current and Position Sensor Fault Diagnosis Algorithm for PMSM Drives Based on Robust State Observer," *IEEE Transactions on Industrial Electronics*, vol. 68. no. 6, pp. 5227-5236, 2021.
6. **K. Choi**, Y. Kim, S.-K. Kim*, and K.-S. Kim, "Auto-calibration of Position Offset for PMSM Drives with Uncertain Parameters," *Electronics Letters*, vol 56, no. 20, pp. 1048-1051, 2020.
5. **K. Choi**, D. S. Kim, and S.-K. Kim*, "Disturbance Observer-based Offset-free Global Tracking Control for Input-constrained LTI Systems with DC/DC Buck Converter Applications," *Energies*, vol. 13, no. 16, p. 4079, 2020.
4. **K. Choi**, Y. Kim, K.-S. Kim, and S.-K. Kim*, "Output Voltage Tracking Controller Embedding Auto-tuning Algorithm for DC/DC Boost Converters," *IET Power Electronics*, vol. 12, no. 14, pp. 3767-3773, 2019.
3. **K. Choi**, K.-S. Kim*, and S.-K. Kim*, "Proportional-type Sensor Fault Diagnosis Algorithm for DC/DC Boost Converters Based on Disturbance Observer," *Energies*, vol. 12, no. 8, p. 1412, 2019.
2. **K. Choi**, Y. Kim, K.-S. Kim*, and S.-K. Kim*, "Using the Stator Current Ripple Model for Real-time Estimation of Full Parameters of a Permanent Magnet Synchronous Motor," *IEEE Access*, vol. 7, pp. 33369-33379, 2019.
1. **K. Choi**, P. Kim, K.-S. Kim*, and S. Kim, "Mixed-modality Stimulation to Evoke Two Modalities Simultaneously in One Channel for Electrocutaneous Sensory Feedback," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 25, no. 12, pp. 2258-2269, 2017.

Peer-reviewed Conference Proceedings

13. M. Ryu, J. Kim, and **K. Choi***, "Imposing Weight Norm Constraint for Neuro-Adaptive Control," *European Control Conference (ECC) 2025*.
12. Y. Jeong, S. Jang, and **K. Choi***, "Neural Network-based Nonlinearity Estimation of Voltage Source Inverter for Synchronous Machine Drives," in *2024 IEEE 33rd International Symposium on Industrial Electronics (ISIE)*, 2024: IEEE.
11. S. Jang, B. Pfeifer, C. M. Hackl, **K. Choi***, "Extended State Observer Based Stator Flux Linkage Estimation of Nonlinear Synchronous Machines," in *2024 IEEE 33rd International Symposium on Industrial Electronics (ISIE)*, 2024: IEEE.
10. G. Park, **K. Choi**, and D. Kum*, "Stack Degradation Protection of FCEVs via Predictive Energy Management Strategy with Segmented Roads," in *2024 American Control Conference (ACC)*, 2024: IEEE, pp. 3643-3649.
9. S. Jang and **K. Choi***, "Stator Flux Linkage Estimation of Synchronous Machines Based on Integration Error Estimation for Improved Transient Performance," in *2023 62nd IEEE Conference on Decision and Control (CDC)*, 2023: IEEE, pp. 4197-4202.
8. M. Ryu, J. Ha, M. Kim, and **K. Choi***, "A Comparative Study of Reinforcement Learning and Analytical Methods for Optimal Control," in *2023 International Workshop on Intelligent Systems (IWIS)*, 2023: IEEE.
7. M. Seo, S. Shin, K. Kim, and **K. Choi***, "Reinforcement Learning-based Collision Avoidance of a Connected and Automated Vehicle at Merging Roads," in *2023 International Workshop on Intelligent Systems (IWIS)*, 2023: IEEE.
6. **K. Choi** and K.-B. Park*, "Model Predictive Torque Control of Synchronous Machines without a Current or Stator Flux Reference Generator," in *2023 IEEE 32nd International Symposium on Industrial Electronics (ISIE)*, 2023: IEEE.
5. J. Kim, Y. Lee, **K. Choi**, J. Song, and K.-B. Park*, "Performance Comparison of Long-horizon FCS-MPC for IPMSM Considering THDi and Inverter Loss," in *2023 11th International Conference on Power Electronics and ECCE Asia (ICPE 2023-ECCE Asia)*, 2023: IEEE, pp. 1680-1685.
4. J. Kim, J. Song, **K. Choi**, and K.-B. Park*, "A Comparison of DPWM and Inverter Loss Energy Based FCS-MPC for IPMSM," in *2022 IEEE 20th International Power Electronics and Motion Control Conference (PEMC)*, 2022: IEEE, pp. 709-714.
3. **K. Choi**, Y. Kim, S.-K. Kim, and K.-S. Kim*, "Proportional-type Current Control of Permanent Magnet Synchronous Motor with Improved Transient Performance over a Wide Speed Range", in *2020 20th International Conference on Control, Automation and Systems (ICCAS)*, 2020: IEEE, pp. 60-63.
2. **K. Choi**, Y. Kim, K.-S. Kim*, and S.-K. Kim, "A Fast and Accurate Numerical Method for Optimal Torque Control of Interior Permanent Magnet Synchronous Motors," in *2019 19th International Conference on Control, Automation and Systems (ICCAS)*, 2019: IEEE, pp.12-16.
1. **K. Choi**, P. Kim, K.-S. Kim*, and S. Kim, "Two-channel Electrotactile Stimulation for Sensory Feedback of Fingers of Prosthesis," in *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2016: IEEE, pp. 1133-1138.

Domestic Journal Papers

6. K. Na, Y. K. Kim, **K. Choi**, and W. Kim*, "A Current-sensor Error Compensation Algorithm for Battery Management Systems Based on Sigma-point Kalman Filter," *Journal of Institute of Control, Robotics and Systems*, vol. 30, no. 10, pp. 1131-1138, 2024.
5. **K. Choi** and K.-S. Kim*, "Current Status and Future Trends in Synchronous Machine Control Technologies: A Focus on Torque Control," *Journal of Institute of Control, Robotics and Systems*, vol. 30, no. 4, pp. 479-491, 2024.
4. K. Na, **K. Choi**, and W. Kim*, "A Current Sensor Fault-detecting Method for Electric Vehicle Battery Systems Based on Disturbance Observer," *Journal of Institute of Control, Robotics and Systems*, vol. 29, no. 12, pp. 1052-1059, 2023.
3. H. Lee, Y. Lee, **K. Choi***, and S.-K. Kim*, "Speed Tracking for Servo Systems via Active Pole-Zero Cancellation Stabilization Technique," *Journal of Institute of Control, Robotics and Systems*, vol. 28, no. 11, pp. 1045-1051, 2022.
2. **K. Choi** and D. Kum*, "Current Status and Future Trends of Electrified Powertrain Technologies," *Mobility Research*, vol. 2, no. 1, pp. 23-42, 2022.
1. J.-W. Hwang, **K. Choi**, H.-T. Seo, K.-S. Kim*, and S. Kim, "Controller Design for Motion Stabilization of a Turret on a Moving Platform," *Journal of Institute of Control, Robotics and Systems*, vol. 23, no. 10, pp. 816-824, 2017.

Research Projects

Development of Robot-Based Cooperative Transport Technology for Heavy-Duty Logistics

- **Sponsor:** KAIST Mobility Research Center *2025 - 2026*
- **Role:** Principal Investigator

Concept Development of RWS Control Logic for Advanced Driving Performance

- **Sponsor:** Hyundai Motor Company *2025 - 2026*
- **Role:** Principal Investigator

Online Deep Learning with Stability and Constraints and its Application to Mobility System Control

- **Sponsor:** NRF (Outstanding Young Scientist Grants) *2025 - 2029*
- **Role:** Principal Investigator

A Control Perspective on Deep Learning and Its Application to Mobility Systems
- **Sponsor:** KAIST *2025 - 2028*
- **Role:** Principal Investigator

Development of Torque Control Algorithm for Compressors Under Rapid Load Changes
- **Sponsor:** LG Electronics Inc *2024*
- **Role:** Principal Investigator

Optimization of Electric Mobility Control Logic
- **Sponsor:** Emotion Co., Ltd. *2023 - 2024*
- **Role:** Principal Investigator

Research on Steering Control Technology for Autonomous Driving PBV
- **Sponsor:** Electronics and Telecommunications Research Institute (ETRI) *2023*
- **Role:** Principal Investigator

Ultra-Realistic Infantry Combat Training Technology
- **Sponsor:** Ministry of National Defense *2022 - 2027*
- **Role:** Co-Principal Investigator

Development of Chassis Platform for Electric Vehicle with Software Open API for Autonomous Driving Function Support
- **Sponsor:** Daegu Metropolitan City *2022 - 2023*
- **Role:** Co-Principal Investigator

Basic research I on optimal power distribution and recovery strategies for electric vehicles
- **Sponsor:** Future EV *2022 - 2023*
- **Role:** Principal Investigator

Inter-university Alliance for cultivating R&D experts in Future vehicular Technologies (I4FT)
- **Sponsor:** Ministry of Trade, Industry and Energy *2022 - 2025*
- **Role:** Researcher

Development of Generalized Model Predictive Torque Control for Synchronous Machines
- **Sponsor:** GIST *2022 - 2024*
- **Role:** Principal Investigator

Development of Technology and Equipment for Evaluating the Performance of Hydrogen Bus Driving Systems
- **Sponsor:** Ministry of Land, Infrastructure and Transport *2021*
- **Role:** Co-Principal Investigator

Development of Real-Time Fuel Efficiency Optimization Technology for Light-Duty Hybrid Electric Trucks
- **Sponsor:** KAIST G-CORE Research Project *2020 - 2021*
- **Role:** Lead Researcher

Development of Autonomous Driving Electric Vehicle based on Infrastructure Sensing
- **Sponsor:** KAIST *2019 - 2021*
- **Role:** Researcher

Establishment of a Foundation for the Promotion of the Electric Vehicle-Related Industry
- **Sponsor:** Jeju Special Self-Governing Province *2019 - 2021*
- **Role:** Researcher

Development of Hybrid Electric Vehicle Conversion Kit for Diesel Delivery Trucks and its Commercialization for Parcel Services
- **Sponsor:** Ministry of Land, Infrastructure and Transport *2017 - 2021*
- **Role:** Researcher

Feasibility Study on Eco-friendly Hybrid Diesel-Electric Trucks for Parcel Delivery Service
- **Sponsor:** Ministry of Land, Infrastructure and Transport *2016 - 2017*
- **Role:** Researcher

Patents

International Patents - Registered

3. K.-S. Kim, **K. Choi**, and I. G. Jang, "Method and apparatus for controlling power of hybrid vehicle considering driving environment," U.S. Patent 12,097,840, Sep. 24, 2024.
2. K.-S. Kim, **K. Choi**, and S.-K. Kim, "Method and apparatus for real-time estimation of full parameters of permanent magnet synchronous motor," U.S. Patent 11,614,488, Mar. 28, 2023.
1. I. G. Jang, D. Kum, K.-S. Kim, K. Jang, C. Lee, J. H. Kim, **K. Choi**, and M. Kim, "Apparatus and method for operating accessories of vehicle during engine stop using one-way clutch pulley," U.S. Patent 11,607,944, Mar. 21, 2023.

International Patents - Pending

1. K.-S. Kim, **K. Choi**, and I. G. Jang, "Method and apparatus for controlling power of hybrid vehicle considering transient characteristics," U.S. Patent Application 18/648,697, Apr. 29, 2024, pending

Domestic Patents - Registered

5. K.-S. Kim, **K. Choi**, and I. G. Jang, "Method and apparatus for controlling power of hybrid vehicle considering transient characteristics," KR Patent 10-2701529, Aug. 28, 2024.
4. K.-S. Kim, **K. Choi**, and I. G. Jang, "Method and apparatus for controlling power of hybrid vehicle considering driving environment," KR Patent 10-2508409, Mar. 6, 2023.
3. K.-S. Kim, **K. Choi**, and S.-K. Kim, "Method and apparatus for real-time estimation of full parameters of permanent magnet synchronous motor," KR Patent 10-2437244, Aug. 24, 2022.
2. I. G. Jang, D. Kum, K.-S. Kim, K. Jang, C. Lee, J. H. Kim, **K. Choi**, and M. Kim, "Apparatus and method for operating accessories of vehicle during engine stop using one-way clutch pulley," KR Patent 10-2053538, Dec. 2, 2019.
1. K.-S. Kim, M.-R. Lim, **K. Choi**, and D. Kum, "Method for controlling hybrid powertrain based on electrified manual transmission using a planetary gear," KR Patent 10-2044210, Nov. 7, 2019.

Domestic Patents - Pending

1. K. Jang, D. Kum, I. G. Jang, K.-S. Kim, J. Byun, **K. Choi**, Y. Kim, and W. Kim, "Hybrid electric vehicle conversion kit and conversion method for internal combustion engine vehicle, and control method for converted vehicle," KR Patent Application 10-0044517, Apr. 6, 2021, pending.

Academic Activities

Journal Editors

- Associate Editor, *International Journal of Control, Automation, and Systems*, 2023 - Present
- Associate Editor, *Journal of Mechanical Science and Technology*, 2023 - Present

Conference Organizing Committees

- Member, Organizing Committee, *ICROS 2026*
- Track Chair for the technical track "Actuators and sensors in motion control", Technical Program Committee, *IEEE/IES AMC 2026*
- Special Session Co-Chair, International Program Committee, *IFAC World Congress 2026*
- Member, Organizing Committee, *ICCAS 2025*
- Member, Organizing Committee, *IEEE ISIE 2024*
- Member, Organizing Committee, *ICROS 2024*

Technical Committees of Academic Societies

- Member, IEEE Control Systems Society (CSS) Technical Committee on Automotive Controls (TC-AC), 2024 - Present
- Member, IEEE Industrial Electronics Society (IES) Technical Committee on Electrical Machines (EMTC), 2024 - Present

Reviewers

- **Journals**: *IEEE Transactions on Industrial Electronics*, *IEEE Transactions on Vehicular Technology*, *IEEE/ASME Transactions on Mechatronics*, *IEEE Transactions on Control Systems Technology*, *IEEE Transactions on Energy Conversion*, *IEEE Control Systems Letters*, *IEEE Sensors Journal*, *IEEE Access*, *International Journal of Control, Automation, and Systems*, *Journal of Mechanical Science and Technology*
- **Conferences**: *IEEE Conference on Decision and Control (CDC)*, *IEEE International Conference on Robotics and Automation (ICRA)*, *Annual Conference of the IEEE Industrial Electronics Society (IECON)*, *American Control Conference (ACC)*, *International Conference on Control, Automation, and Systems (ICCAS)*

Teaching Experience

Korea Advanced Institute of Science and Technology (KAIST) — *Daejeon, Korea*

Assistant Professor — *May 2025 - Present*

- Learning-Based Control for Mobility Systems (Graduate Course) - Fall 2025

Gwangju Institute of Science and Technology (GIST) *Gwangju, Korea*
Assistant Professor *Mar 2022 - May 2025*

- Introduction to Mobility Engineering (Graduate Course) - Fall 2023, Spring 2025
- Nonlinear Control (Graduate Course) - Fall 2022, Fall 2024
- Microprocessor and Application (Undergraduate Course) - Spring 2022/2023/2024

Korea Advanced Institute of Science and Technology (KAIST) *Daejeon, Korea*
Guest Lecturer *Spring 2021*

- Delivered lectures on vehicle dynamics and control for the graduate course, "Green Railway System Engineering"

Invited Talks

Korea Research Institute of Chemical Technology *Daejeon, Korea*
"Online Neural Network Learning via Optimization-Based Methods" *May 26, 2025*

KRoc 2025 *Pyeongchang, Korea*
"Optimal Control of Mobility Systems Considering Uncertainties," Outstanding Young Researcher Session *Feb 14, 2025*

2024 Brainlink X-Day *Busan, Korea*
"Predictive Energy Management of Connected Electrified Vehicles" *Nov 7, 2024*

Nanyang Technological University (NTU) *Singapore*
"Generalized Model Predictive Torque Control of Synchronous Machines," Motor Lab Seminar *Aug 28, 2024*

National University of Singapore (NUS) *Singapore*
"Predictive Energy Management of Connected HEVs," ME Department Seminar *Aug 26, 2024*

Institute of Embedded Engineering of Korea *Daegu, Korea*
"On-device Learning for Mobility Control," The 2nd Future Mobility Technology Seminar *Jul 9, 2024*

ICROS 2024 *Daejeon, Korea*
"Optimal Control of Mobility Systems Considering Uncertainties," Outstanding Young Researcher Session *Jul 2, 2024*

2024 KSAE Spring Conference *Geoje-si, Korea*
"Predictive Energy Management of Connected and Automated Vehicles," Outstanding Young Researcher Session *Jun 21, 2024*

Gwangju National Science Museum *Gwangju, Korea*
"Future Vehicles and AI" *Dec 20, 2023*

MERRIC *Webinar*
"Control of Connected and Automated Vehicles" *Dec 20, 2023*

ICCAS 2023 *Yeosu-si, Korea*
"Generalized Model Predictive Torque Control of Synchronous Machines," Frontiers Session *Oct 18, 2023*

YEONGGWANG e-MOBILITY EXPO *Yeonggwang, Korea*
"About future mobility: Connected, Automated, and Electric Vehicles" *Oct 8, 2023*

Daedong *Webinar*
"Introduction to vehicle control unit (VCU) design for autonomous electric vehicles" *Sep 20, 2023*

LG Electronics Home Appliance & Air Solution *Webinar*
"Energy management control of e-Mobility" *Jul 17, 2023*

Incheon National University *Online*
"Predictive energy management of electrified vehicles" *Apr 24, 2023*

emotion *Daegu, Korea*
"Introduction to vehicle control unit (VCU) design for autonomous electric vehicles" *Feb 14 - Feb 28, 2023*

emotion *Daegu, Korea*
"Introduction of vehicle control technology for autonomous electric vehicles" *Oct 20, 2022*

Electronics and Telecommunications Research Institute (ETRI) *Daegu, Korea*
"Control Theory X AI for Future Mobility" *Oct 18, 2022*

KAIST Cho Chun Shik Graduate School of Mobility *Webinar*
"Control Theory X AI for Future Mobility" *Sep 29, 2022*

Daedong *Changnyeong, Korea*
"Introduction of integrated vehicle control technology for electric vehicles" *Jul 21, 2022*

LG Electronics Home Appliance & Air Solution — *Webinar*
"Intelligent Optimal Torque Control of Synchronous Machines" — *May 26, 2022*

Korea Institute of Machinery & Materials (KIMM) — *Daejeon, Korea*
"Real-time optimal control of mechatronics systems" — *Apr 12, 2022*

KAIST Cho Chun Shik Graduate School of Mobility — *Daejeon, Korea*
"Hybrid conversion technology for light-duty diesel trucks" — *May 20, 2021*

NMC — *Busan, Korea*
"State-of-the-art control techniques for automotive traction drives" — *May 7, 2021*

Korea Institute of Machinery & Materials (KIMM) — *Daejeon, Korea*
"Dynamic programming for HEV control" — *Jan 14, 2020*

Honors & Awards

Outstanding Contribution Award
Journal of Mechanical Science and Technology — *Sep 26, 2024*

Outstanding Young Researcher Award
The 39th Institute of Control, Robotics and Systems (ICROS) Annual Conference — *Jul 3, 2024*

Best Paper Award
The 39th Institute of Control, Robotics and Systems (ICROS) Annual Conference — *Jul 3, 2024*

Outstanding Contribution Award
Journal of Mechanical Science and Technology — *Mar 27, 2024*

Outstanding Young Researcher Award
The 23rd International Conference on Control, Automation, and Systems (ICCAS) — *Oct 19, 2023*

One Best Paper Award and Two Undergraduate Paper Awards
The 38th Institute of Control, Robotics and Systems (ICROS) Annual Conference — *Jun 22, 2023*

Best Paper Award
2021 Korean Society of Automotive Engineers (KSAE) Fall Conference — *Dec 16, 2021*

Best Paper Award
The 52nd Korean Institute of Electrical Engineers (KIEE) Summer Conference — *Sep 13, 2021*

Outstanding Achievement *Summa Cum Laude* Award
Department of Mechanical Engineering, KAIST — *2011*
Highest honor by the department for distinguished academic excellence in 2010.