

Infrastructure, Mobility & Robots

The physical world is being reshaped by rapid advances in infrastructure systems, mobility technologies, and intelligent machines. Infrastructure is becoming increasingly instrumented, data-rich, adaptive, and connected. Mobility systems are evolving into intelligent ecosystems that integrate autonomous agents, human decision-making, and real-time data. Robots are expanding from controlled industrial environments into construction sites, warehouses, healthcare settings, public spaces, and homes. Addressing these transformations requires collaboration across disciplinary boundaries. The Infrastructure, Mobility, and Robots symposium explores how the built environment, mobility systems, and intelligent machines can be designed, operated, and integrated to address complex societal and technological challenges. By bringing together researchers, practitioners, and emerging scholars, the IMR symposium provides a platform for sharing innovative research, identifying cross-disciplinary collaboration opportunities, and shaping the future of intelligent, resilient, and human-centered physical systems.

Chair



JuHyeong Ryu

West Virginia
University

Co-chairs



Eul-Bum Lee

POSTECH



Seokgi Lee

Youngstown State
University



Ryan Choi

Eastern Michigan
University

**Infrastructure,
Mobility & Robots**

@Augusta B

Thursday, Aug 6 5:00 – 6:45pm

Connected Mobility, Cybersecurity, and Adaptive Systems

Chair: Seokgi Lee (Youngstown State University), Ji-Hung (Ryan) Choi (Eastern Michigan University)

Time	Title and Speaker
5:00	Session Introduction (Session Chairs: Seokgi Lee, Ji-Hung(Ryan) Choi)
5:15	An Attribute Group-Based Conjoint Analysis Model for Consumer Preference Measurement: Application to EV Design Rhim, Hosun (Korea University Business School)
5:30	Structural Reorganization of the Global Container Shipping Network under Geopolitical Risk: The Case of the Red Sea Crisis Park, Suyeon (Inha University)
5:45	FI-DARA: Adaptive Edge-Cloud Routing for Privacy-Preserving Health Monitoring Choi, Michael (University of Illinois Chicago)

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Time	Title and Speaker
6:00	Beyond Economic Returns: The Duality of AI Adoption on Data Breach Incidents Jaesung Shin (Mississippi State University)
6:15	A Semi-Markov Process Approach to Quantify Material Content Over Multiple Product Lifecycles with Application to a Hard Disk Drive Yong Han Kim (Purdue University)
6:30	Nudging Secure Behavior: Examining the Effects of Attentional Nudge Strategies on Phishing Email Detection Performance Seeung Oh (South Carolina State University)
6:45	Session Q&A and Conclusion

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Friday, Aug 7 3:15 – 5:00pm

Resilient Infrastructure and Intelligent Physical Systems

Chair: JuHyeong Ryu (WVU), Eul-Bum Lee (POSTECH)

Time	Title and Speaker
3:15	Session Introduction (Session Chair: JuHyeong Ryu)
3:15	Construction Automation and Robotics in South Korea: Current Status and Future Directions Dr. Jae Young Kim, CTO and Head of the Construction R&D Division at Hyundai Motor Group (HMG) Invited
3:45	Value for Money Analysis of Public-Private Partnership and Public Sector Comparator for Building Project Joseph Kim(California State University Long Beach)
4:00	Safe, Permeable and Quiet Highway Pavement Infrastructure for the States with Severe Freeze/Thaw Cycles Hosin Lee (University of Iowa)
4:15	Mixed Traffic Cooperative Platooning using Multi-Agent Reinforcement Learning Byungkyu Brian Park (University of Virginia)
4:30	Knowledge-Graph Integrated Agentic Physical/Shadow AI for Autonomous Ships: A Hybrid Approach with LLM and Ontology Geonwoo Kim (POSTECH)
4:45	Narrative Manufacturing: A Human-Centered Path from Automation to Mass Innovation Han, Changheon (Purdue University)
5:00	Session Q&A and Conclusion

Saturday, Aug 8 8:00 – 10:00am

Sensing, Automation, and Infrastructure Intelligence

Chair: Woo Hyung Lee (University of Central Florida)

Time	Title and Speaker
8:00	Session Introduction (Session Chair: Woo Hyung Lee)
8:00	Novel Electrochemical MIP Sensors for Monitoring Emerging Water Contaminants: PFAS and Odor Detection Woo Hyung Lee (University of Central Florida)
8:15	Performance Assessment of Permeable Pavement under Intense Rainfall in U-Ecotron: A CFD-Based Approach Seunghun Baek (Seoul National University)
8:30	Automated System for Bridge Corrosion Detection and Severity Classification Joseph Kim (California State University Long Beach)
8:45	AI-Driven Pavement Crack Detection and Severity Classification Joseph Kim (California State University Long Beach)
9:00	Compound Heatwave–Extreme Rainfall Effects on Urban Drainage and LID Performance: A SWMM Continuous Simulation Study in Seoul Yun, Hyeryeong (Seoul National University)
9:15	Mobile Routing System for Older Adults' Walking John Sohn (University of Nevada Las Vegas)
9:30	Exploring the Electro-Tribological Behavior of Laser Cladded High Entropy Alloys Dongyun Lee (Iowa State University)
9:45	Optimal Camera Placement for 3D Surface Coverage Sumin Hu (University of Texas at Austin)
10:00	Session Q&A and Conclusion

Emerging Research in Infrastructure, Mobility, and Robots

Chair: JuHyeong Ryu (WVU), Eul-Bum Lee (POSTECH), Seokgi Lee (Youngstown State University), Ji-Hung (Ryan) Choi (Eastern Michigan University)

P1	Influence of cementitious additives mixing method with clay soil in unconfined compressive strength Hyunjong Cha (Texas A&M University)
P2	Hierarchical Framework using Reinforcement Learning for AMR Dispatching in Flexible Job Shop Environment Jaemin Park (Purdue University)
P3	AI-CFD Coupled Simulation for Urban Ventilation and Heat Island Mitigation of Green Infrastructure atop the Yangjae IC Underground Road Hyunjae Kim (Seoul National University)
P4	Automated Urban Flood Risk Screening Across Diverse Korean Terrain Types Using SWMManywhere and SSP Climate Scenarios Nayoung Kim (Seoul National University)
P5	Safety-by-Design Vision-Language Models for Bridge Inspection Documentation Quality Control Kyubyung Kang (Purdue University)
P6	Metaheuristic Optimization of Railroad Horizontal Alignment with Complete Curve Geometry and Obstacle Avoidance Myungseob Kim (KOTTA)
P7	CROP-LO: Crop-Row-Optimized LiDAR Odometry for Autonomous Navigation and Crop Monitoring in Cornfields Kitae Kim (Purdue University)
P8	A Post-Hurricane Building Roof Damage Assessment Using Multi-Source Aerial Observations Anjin Chang (Michigan State University)
P9	A Preliminary Study on the Feasibility of UAS-Based Lighting in Road Construction Work Zones Kyubyung Kang (Purdue University)
P10	AI-Enabled Drone for Wildfire Spread Classification Using Synthetic Image Sequences Kevin Lee (Cornell University)
P11	A Smart Home Interface Design Framework to Support Energy-Saving Behaviors Jinmog Han (Iowa State University)
P12	Heuristic Approach for Collaborative UAV-UGV Area Coverage Path Planning with Battery Constraints Jackie Lee (Texas A&M University)

Poster Session

@ International
Ballroom II

Friday, Aug 7 5:00 – 6:45pm

Emerging Research in Infrastructure, Mobility, and Robots

Chair: JuHyeong Ryu (WVU), Eul-Bum Lee (POSTECH), Seokgi Lee (Youngstown State University), Ji-Hung (Ryan) Choi (Eastern Michigan University)

P13	Physics-Informed Neural Network Modeling of Salt Transport and Thermal Conductivity Evolution in Unsaturated Soils Jongwan Eun (University of Maryland)
P14	Estimating the natural gas demand margin of electricity load growth Jin Wook Ro (Oak Ridge National Laboratory)
P15	End-to-End Computer Vision Pipeline for Perforation Defect Detection and Classification in Industrial Imaging Joanne Yun (University of Wisconsin-Madison)
P16	An Optimal Consolidation Policy for Vehicle Routing Plans in Last-Mile Delivery: A Deep Q-Learning Approach Seokgi Lee (Youngstown State University)
P17	Analysis of the Impact and Time Lag of Maritime Supply Chain Disruption on Air Freight Demand and Freight Rates Seryang Kim (Inha University)
P18	From Scene Perception to Actionable Space: Semantic Risk Field for Safe Robot Navigation Seonho Woo (Purdue University)
P19	Short-Term Resilience Strategies Amid Supply Disruptions: An Analytical Perspective Ryan Choi (Eastern Michigan University)
P20	Mixed Reality Training for Industrial Assembly: Integrating Optimized Task Sequences with Motion-Based Ergonomic Monitoring JuHyeong Ryu (West Virginia University)