

# COLLOQUIUM ON MULTIMEDIA COMPUTING SYSTEMS 2023



Prof. Byung-Cheol Min  
(Purdue University)

## Integrating Human Intelligence into Robot Learning

As robots continue to integrate into our society, they are increasingly faced with more complex tasks that demand human-like perception, decision-making, and adaptability. This trend has driven the need for incorporating human intelligence into robot learning, enabling these machines to better comprehend and interact with the intricate, dynamic, and frequently unpredictable nature of human environments. In this talk, I will introduce the research in human-in-the-loop (HiL) robot learning that the SMART Lab of Purdue University has done or is currently undertaking.

This talk is primarily divided into two parts, introducing two main streams in HiL robot learning: preference learning and learning from demonstration (LfD). In the first part, the discussion revolves around utilizing preference learning for socially aware robot navigation tasks. By incorporating human expectations derived from feedback, robots can significantly enhance their decision-making and adaptability in complex, human-populated environments, leading to more efficient and effective performance. In the second part, I will present LfD algorithms we have designed for both single robot and multi-robot system control, showcasing how these techniques enable robots to learn and collaborate efficiently while performing tasks, ultimately improving the overall functionality and capabilities of robotic systems.

### Short Bio:

Dr. Byung-Cheol Min is an Associate Professor and University Faculty Scholar in the Department of Computer and Information Technology at Purdue University, where he directs the SMART Lab. He received the B.S. degree in electronics engineering and the M.S. degree in electronics and radio engineering from Kyung Hee University, Yongin, South Korea, in 2008 and 2010, respectively, and the Ph.D. degree in technology with a specialization in robotics from Purdue University, West Lafayette, IN, USA, in 2014. He was a Postdoctoral Fellow with the Robotics Institute, Carnegie Mellon University, Pittsburgh, PA, USA. His research interests stand at the intersection of human-robot interaction and multi-robot systems, and he explores problems of planning and control, algorithms, and robot learning in these areas and applies them to field robotics and to assistive technology and robotics. He has worked on designing algorithms and systems to enable multiple robots to collaborate with each other in a distributed way and to work with humans as a multi-human-multi-robot team. He has also studied how learning methods can enable robots to flexibly interact with any humans, in any situation, anywhere. He was a recipient of the NSF CAREER Award in 2019, and has received numerous awards from Purdue University, including the Purdue PPI Outstanding Faculty Award in Discovery in 2019, the Purdue CIT Outstanding Graduate Mentor Award in 2019, the Purdue Focus Award in 2020, the Purdue PPI Interdisciplinary Research Collaboration Award in 2021, and the Purdue Corps of Engagement Award in 2022. He was named a Purdue University Faculty Scholar in 2021.

**June 07. 2023 (Wed.) 10:30am – 12:00 pm (KST)**  
**Location: International Hall, Room 90104**

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