

SCHOOL OF MECHANICAL & MATERIALS ENGINEERING  
**GRADUATE SEMINAR SERIES**

## **Adaptable Intelligence: From Distributed Systems to Soft Robots**

**Presented by**

**Dr. Kiju Lee, Mechanical & Aerospace Engineering, Case Western Reserve University**

### **Abstract**

Distributed intelligence in autonomous systems aims to achieve adaptability in communication, sensing, computing, and control through strategic collaboration among multiple agents. It can be applied to various forms of modern technologies to address challenges associated with unknown dynamic environments, unspecified tasks, or human-in-the-loop applications. Three research topics which employ distributed intelligence from different perspectives – but with shared knowledge – will be presented in this seminar. The first topic is on tangible interactive games for automated cognitive assessment and training utilizing distributed communication and self-synchronization techniques. Secondly, distributed communication and control algorithms are further developed for consensus decision making and global shape formation in a swarm of primitive robots with limited sensing, communication, and computing capabilities. Lastly, Dr. Lee will present design and fabrication methodologies for origami-inspired soft robotic mechanisms and potential control strategies based on distributed control. In particular, a new compliant and continuum mechanism, called TWISTER, and its embodiment into different types of robots will be presented.

### **Biography**

Kiju Lee is Nord Distinguished Assistant Professor in Mechanical and Aerospace Engineering at Case Western Reserve University. Her research area is in distributed intelligence and robotics, including sensor-networked systems, swarm robots, novel robotic mechanism design, and human-robot interaction. She directs Distributed Intelligence and Robotics Laboratory (dirLAB), which facilitates research and hands-on educational activities for both graduate and undergraduate students. Her research has been funded by NSF, National Academies Keck Futures Initiative, Clinical and Translational Science Collaborative in Cleveland, and VA Applied Platform Technology Center. Prof. Lee earned her MS and PhD in Mechanical Engineering from Johns Hopkins University, Baltimore, Maryland, and B.S.E. in Electrical and Electronics Engineering from Chung-Ang University, Seoul, Korea.

**Thursday, February 21, 2019**

**11:00am to Noon**

**ETRL room 101**

Meet the speaker before the seminar in ETRL room 119, 10:30am to 10:50am. Light refreshments will be served.

