Modeling, Control, and Learning Approaches in Human-Multi-Robot Interaction Systems.

Yue "Sofie" Wang, PhD
Warren H. Owen – Duke Energy Professor of Engineering
Interdisciplinary and Intelligent Research (I2R) Laboratory
Department of Mechanical Engineering
Clemson University

Friday, January 27, 2023 – 10:30 am
Virtual

Abstract: Robots and autonomous systems are becoming essential component that empowers economic and human possibility and will potentially change the future of work and life. The human-robot collaboration integrates the best part of human intelligence with the advantages of robotic systems. Beyond performance-centric design, human intent and intelligence may be encoded into robot decision-making, motion planning, and control to achieve safer and more reliable autonomy with higher user acceptance. However, the modeling, control, and learning of human-robot interaction systems, especially for multi-robot systems, is challenging and remains an active area. The talk will begin with an overview of research in human-robot interaction at the Interdisciplinary Intelligent Research (I2R) lab in the Mechanical Engineering Department at Clemson University. The background and motivation of human-autonomy integration will be introduced. The modeling part will focus on computational models and machine-learning approaches for human trust in multi-robot systems. We will then introduce multi-robot control and symbolic motion planning. Applications in the teleoperation of unmanned aerial vehicles and unmanned ground vehicles will be discussed. The talk will conclude with a summary and a discussion about future research.

Bio: Dr. Yue “Sophie” Wang is the Warren H. Owen-Duke Energy Professor of Engineering and the Director of the I2R laboratory at Clemson University. She received a Ph.D. degree in Mechanical Engineering from Worcester Polytechnic Institute in 2011 and held a postdoctoral position in Electrical Engineering at the University of Notre Dame from 2011 to 2012. Her research interests include human-robot interaction systems, multi-robot systems, and cyber-physical systems. Dr. Wang has received the AFOSR YIP award, the NSF CAREER award, and the Air Force Summer Faculty Fellowship. Her research has been supported by NSF, AFOSR, AFRL, ARO, ARC, NASA, US Army, and industry. Dr. Wang is a senior member of IEEE and a member of ASME. She serves as the Associate Editor of the IEEE Robotics and Automation Magazine (RAM), the ASME Journal of Autonomous Vehicles and Systems (JAVS), and the IEEE Open Journal of Control Systems (OJ-CSYS). She is also a Technical Editor of the IEEE/ASME Transactions on Mechatronics (TMECH). Her work has been featured in NSF Science360, ASEE First Bell, State News, SC EPSCoR/IDeA Research Focus, and Clemson University News.