UTC INSTITUTE FOR ADVANCED SYSTEMS ENGINEERING

Seminar Series

Monday October 30th, 2017
1:00 – 2:00PM
UConn, Storrs Campus – ITEB 336
To view live webcast click here

Human-Robot Physical Interaction for Neuromuscular Adaptive Robot Co-workers

This talk will introduce the speaker's recent research effort that aims to apply a systems engineering approach to the design and control of co-robots for industry and medical applications. The research approach is threefold: (1) design of high-precision mechanisms, (2) understanding of the mechanisms of neuromotor adaptations in humans, and (3) adaptive control of physical human-robot interaction (pHRI). A project supported by the National Science Foundation aims to understand association between physiological measures such as electromyography and system performance characteristics in robot-assisted assembly tasks. A machine learning method is applied to achieve effective prediction of operator intent during tasks to proactively adjust the contact impedance between the operator and robotic device for high performance and stability. Another project studies temporal dynamics of cortical facilitation with afferent stimulation for the assessment of stroke rehabilitation. A robotic device that combines magnetic brain stimulation and peripheral mechanical stimulation has been developed to reproduce paired associative simulation (PAS). The research reveals that precise timing control of actuation is the key for successful robotic neuromodulation. Mechanical stimulation and induced adaptation can also improve sensory and motor performance in dexterous manual hand tasks.

Jun Ueda

Dr. Jun Ueda is currently an Associate Professor and Woodruff Faculty Fellow in the G.W.W. School of Mechanical Engineering at Georgia Institute of Technology. Dr. Ueda received the B.S., M.S., and Ph.D. degrees from Kyoto University, Kyoto, Japan, in 1994, 1996, and 2002 all in Mechanical Engineering. From 1996 to 2000, he was a Research Engineer at the Advanced Technology Research and Development Center, Mitsubishi Electric Corporation, Japan. He was an Assistant Professor of Nara Institute of Science and Technology, Japan, from 2002 to 2008. During 2005-2008, he was a visiting scholar and lecturer in the Department of Mechanical Engineering, Massachusetts Institute of Technology. He joined the G. W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology as an Assistant Professor in 2008. He served as the Director for the Robotics PhD Program and Associate Chair in Academics in the Institute for Robotics and Intelligent Machines (IRIM) at Georgia Tech for 2015-2017. He received a Fanuc FA Robot Foundation Best Paper Award in 2005, IEEE Robotics and Automation Society Early Academic Career Award in 2009, and Advanced Robotics Best Paper Award in 2015. He is the chair of the ASME Biosystem and Healthcare Technical Committee. He served on the editorial board of the IEEE/ASME Transactions on Mechatronics. He currently serves as an Associate Editor for the ASME Journal of Mechanics and Robotics, IEEE RAS Robotics and Automation Letters, International Journal of Intelligent Robotics and Applications, and IEEE Transactions on Robotics. He is the author of Cellular Actuators: Modularity and Variability in Muscle-Inspired Actuation, Butterworth-Heinemann, 2017, and Human Modeling for Bio-Inspired Robotics, Academic Press, 2017.

Key Words:

Assistive robots, teleoperation, rehabilitation, assembly, haptic interaction, neuromodulation

Upcoming Distinguished Lectures

11/13/17 – Prodromos Daoutidis

Upcoming Seminars

12/4/17 – Lyle Ungar
Deep Learning and its Impact on Engineering

Website:
www.utc-iase.uconn.edu
Email:
utc-iase@engr.uconn.edu
Phone:
860.486.3355



United Technologies Corporation

Institute for Advanced Systems Engineering

UNIVERSITY OF CONNECTICUT

UCONN

SCHOOL OF ENGINEERING