



# Electrical and Computer Engineering

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Title

Robust and Fast Neuroimaging for Improving Performance of Human-Robot Interaction

Thursday, February 6, 2020

1:00-2:00 p.m.

HEC 356

## Abstract

Communication methods of Human-Robot Interaction (HRI) include gestures, natural language, and haptics. However, these methods have no direct information exchange between robots and human brain imaging, which straightly encodes human intentions and emotions. Therefore, social, emotional, and cognitive computing is limited in HRI. To address such a critical issue, this talk will present recent efforts on investigating robust and fast neuroimaging for improving HRI performance. Neuroimaging modalities Electroencephalogram (EEG) and Magnetic Resonance Imaging (MRI) have been studied for guiding and navigating robots. Neuroimaging problems, such as limited training data, nonstationary brain signals, slow imaging speed, and low signal-to-noise ratio (SNR) have been improved. Functional and anatomical neuroimaging enables humans not only to interact with robots using decoded brain activities, but also to navigate microrobots for targeted drug delivery. This talk will also discuss future work on multimodal HRI, rehabilitation robot with portable MRI, and autism robot with neuroimaging guidance.

## Biography

Yuchou Chang is an Assistant Professor of Computer Science at University of Houston-Downtown. He received his Ph.D. degree in Electrical Engineering from University of Wisconsin-Milwaukee in 2012 and Post-Doctoral training at Barrow Neurological Institute from 2013 to 2015. His research interests centrally focus on the area of Biomedical Imaging and Human-Robot Interaction. He has authored over 90 peer-reviewed publications. His research has been supported by the Department of Defense (DOD), Nuclear Regulatory Commission (NRC), Department of Education (DOED), Texas Workforce Commission (TWC), and Blue Waters Petascale Computing. He received E. Kika De La Garza Fellowship from the United States Department of Agriculture (USDA) in 2016, for contributing to workforce diversity and assisting in an effort to strengthen the nation's capacity to provide high quality education for minority. He has received several awards, such as the Best Technical Report & Semi-Finalist of National Aeronautics and Space Administration (NASA) Swarmathon Robotics Virtual Competition 2017.