Joint Department of

BIOMEDICAL ENGINEERING

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Coulter Seminar Series Presents

Rehabilitation Engineering

Mobility and Manipulation Independence with Interface-Aware Robotic Intelligence

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Brenna Argall is a professor of Mechanical Engineering, Computer Science, and Physical Medicine & Rehabilitation at Northwestern University. She is founder and director of the assistive & rehabilitation robotics laboratory (argallab) at the Shirley Ryan AbilityLab (formerly the Rehabilitation Institute of Chicago), the #1-ranked rehabilitation hospital in the United States. The mission of the argallab is to advance human ability by leveraging robotics autonomy. Argall is a Fellow of the American Institute for Medical and Biological Engineering (2023), a recipient of the NSF CAREER award (2016), and was named one of the 40 under 40 by Crain's Chicago Business (2016). Her Ph.D. in Robotics (2009) was received from the Robotics Institute at Carnegie Mellon University, as well as her B.S. in Mathematics (2002). Prior to joining Northwestern and RIC, she was a postdoctoral fellow (2009-2011) at the École Polytechnique Fédérale de Lausanne (EPFL) and prior to graduate school she held a Computational Biologist position at the National Institutes of Health (NIH). More recently (2019), she was a visiting Research Fellow at the Wyss Center for Bio and Neuroengineering in Geneva, Switzerland.

ABSTRACT

As need increases, access decreases. It is a paradox that as human motor impairments become more severe, and increasing assistance needs are paired with decreasing motor ability, the very machines created to provide this assistance become less and less accessible to operate with independence. My lab addresses this paradox by incorporating robotics autonomy and intelligence into machines that enable mobility and manipulation: leveraging robotics autonomy, to advance human autonomy. Achieving the correct allocation of control between the human and the autonomy is essential, and critical for adoption. The allocation must be responsive to individual abilities and preferences, that moreover can be changing over time, and robust to human-machine information flow that is filtered and masked by motor impairment and control interface. In this talk, I will discuss these challenges, highlight our recent development of interface-aware robotic intelligence, and overview a sampling of ongoing projects and studies within my lab.

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