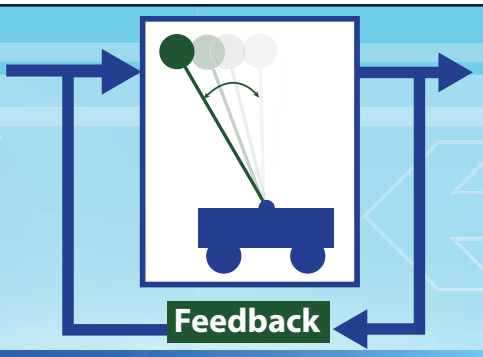
COLLEGE OF ENGINEERING

Control Seminar



Honoring Elmer Gilbert (1930-2019) and his contributions to Control Systems

Toward Telelocomotion: Human Sensorimotor Control of Contact-Rich Robot Dynamics

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3:30 pm – 4:30 pm 1500 EECS

ABSTRACT: Human interaction with the physical world is increasingly mediated by automation — planes assist pilots, cars assist drivers, and robots assist surgeons. Such semi-autonomous machines will eventually pervade our world, doing dull and dirty work, assisting the elderly and disabled, and responding to disasters. Recent results (e.g. from the DARPA Robotics Challenge) demonstrate that, once a robot reaches a task area and grasps the necessary tool, handle, or wheel, they are able to plan and execute whole-body motions to accomplish complex goals. However, robots frequently lose their balance and fall en route to tasks, necessitating human supervision and intervention. Integrating legged machines in daily life will require safe and stable telelocomotion, that is, robot ambulation guided by humans. This talk presents our efforts to tackle the telelocomotion problem from the bottom-up and top-down, analyzing contact-rich robot dynamics to derive design principles for intrinsically-stable terradynamics, and leveraging the theory of human sensorimotor learning and control to design provably-safe interfaces for nonlinear control systems including legged robots.

BIO: Sam Burden is a control theorist who is broadly interested in discovering and formalizing principles of sensorimotor control. Specifically, he focuses on applications in dynamic and dexterous robotics, neuromechanical motor control, and human-cyber-physical systems. He earned my BS with Honors in Electrical Engineering from the University of Washington in Seattle in 2008, and his PhD in Electrical Engineering and Computer Sciences from the University of California in Berkeley in 2014, where he subsequently spent one year as a Postdoctoral Scholar. In 2015, Sam returned to UW EE (now ECE) as an Assistant Professor; in 2016, he received a Young Investigator award from the Army Research Office (ARO-YIP).

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