

# MECHANICAL ENGINEERING

## SEMINAR

# ***Motion Planning and Control for Robot and Human Manipulation***

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Friday, October 26, 2018  
11:00 am, ECSS 2.415

### **Abstract**

In this talk I will describe our progress on motion planning and control for two very different manipulation problems: (1) dexterous manipulation by robots and (2) control of arm neuroprosthetics for humans with spinal cord injuries.

The first part of the talk will focus on manipulation modes commonly used by humans but mostly avoided by robots, such as rolling, sliding, pushing, pivoting, tapping, and in-hand manipulation. These manipulation modes exploit dynamics to control object motions.

In the second part of the talk I will describe a recent project on control of a functional electrical stimulation neuroprosthetic for the human arm. The goal of the project is to allow people with high spinal cord injury to recover the use of their arms for activities of daily living. Beginning with traditional methods for system identification and control of robot arms, I will describe how we have extended the approach to identification and control of an electrically stimulated human arm.

### **Biography**

Kevin Lynch is Professor and Chair of the Mechanical Engineering Department at Northwestern University. He is a member of the Neuroscience and Robotics Lab ([nxr.northwestern.edu](http://nxr.northwestern.edu)) and the Northwestern Institute on Complex Systems ([nico.northwestern.edu](http://nico.northwestern.edu)). His research focuses on dynamics, motion planning, and control for robot manipulation and locomotion; self-organizing multi-agent systems; and functional electrical stimulation for restoration of human function.