ELECTRICAL & COMPUTER ENGINEERING

ECE 590 Graduate Seminar

All are Welcome!

Electrical and Computer Engineering Departmental Seminar:

From Diabetes to the Power Grid: Solving Problems with Control and Optimization

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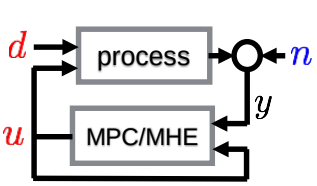
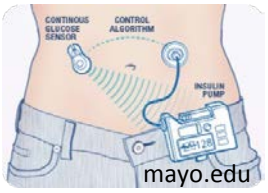
Friday, March 9, 2018, at 3 PM

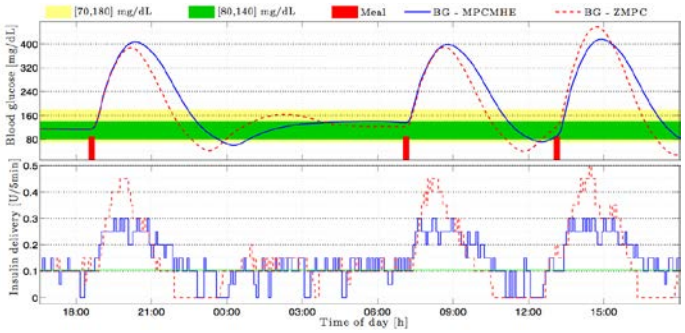
Woodward Hall, Room 147

ABSTRACT

In this talk, we discuss the use of control and optimization for solving sophisticated engineering problems, with motivating examples in bioengineering and energy systems. Model predictive control is a particularly popular online optimal control approach due to its ability to explicitly handle hard state and input constraints. We introduce an output-feedback approach to model predictive control for discrete-time nonlinear systems. This approach combines state estimation and control into a single min-max optimization; specifically, a criterion that involves finite forward and backward horizons is minimized with respect to control input variables and is maximized with respect to the unknown initial state as well as disturbance and measurement noise variables. Lastly, we discuss the advantages of using this combined optimal estimation and control approach in applications including the coordination of unmanned aerial vehicles, feedback control of an artificial pancreas, and potential applications in power and energy systems.







Speaker Bio **David A. Copp** is a Postdoctoral Appointee at Sandia National Laboratories, where he is working on grid integration, analysis, and control of energy storage. He received his B.S. degree in mechanical engineering from the University of Arizona in Tucson, AZ, in 2011. He received his M.S. and Ph.D. degrees in mechanical engineering from the University of California, Santa Barbara in 2014 and 2016, respectively, where he was a member of the Center for Control, Dynamical-Systems, and Computation. His broad research interests include control, analysis, and simulation of nonlinear and hybrid systems with applications to power and energy systems, multi-agent systems, robotics, and biomedicine.

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