



Department of Engineering
Seminar Program
Wednesday, February 17, 2016
Shanahan Teaching and Learning Center
Lecture Hall 1430, 4:15pm

“Engines, Drivers, and Ethics: There’s More to Cars than Rush Hour”

Selina Pan, Ph.D., Postdoctoral Scholar, Stanford University

Summary:

Cars have taken their place in our lives as much more than a mode of transportation. They offer pragmatic mobility, idealistic adventure, and promises of emerging technology. Simultaneously, they pose challenges in environmental hazards, driver distraction, and fear of robot autonomy. Thus, cars have generated interest in many different areas of study. This talk will cover three main foci, each taking motivation from different aspects of the current state of the automobile. (1) Effective engine control is key for reducing cold start emissions harmful to the environment. Because the engine is such a complicated plant, there are many errors that arise when transitioning from modeling its dynamics to implementing a digital control system. This talk presents a sliding control strategy that addresses these issues that arise from continuous to discrete time conversion for ideal engine trajectories applied toward emission reduction. (2) The emergence of automated vehicles has inspired promising technological advances, while raising unforeseen and interesting research questions. Handover, the act of switching control between the vehicle and a human driver, presents a challenge in a driver’s ability to immediately take over safely. This talk will present work on driver adaptation to vehicle handling changes. (3) A broader issue in automated vehicles that is gaining traction beyond the engineering community is that of ethics in self-driving cars. Human drivers have been navigating ethical driving dilemmas for decades to the best of their ability. Now, automated vehicles will need to navigate these situations themselves. This talk will describe ongoing work on ethically programming automated vehicles, presenting an approach motivated by philosophical ethical frameworks and resulting vehicle behavior in simple traffic scenarios.

Bio:

Selina Pan received the Ph.D. degree in mechanical engineering from UC Berkeley in 2014, the M.S. degree in mechanical engineering from UC Berkeley in 2009, and the B.S.E. degree in aerospace engineering from the University of Michigan in 2008. She is currently a postdoctoral scholar at Stanford University, where her research interests are in ethics of automated vehicle control and driver-vehicle interaction. Her doctoral research was in sliding control for nonlinear systems, with applications to automotive engine control.