ABSTRACT
Unmanned aerial vehicles are increasingly being considered to carry out complex missions within dynamic environments. More specifically, aerial transportation of cable-suspended loads is extremely important in emergency rescue missions, as well as for time-critical cargo delivery tasks (e.g., food, medicines and so forth). In this talk, we discuss the challenging problem of using aerial robots, in particular quadrotors, to transport suspended loads safely and efficiently. This webinar provides insight into problems that can arise in aerial transportation and suggests techniques from wide range of control algorithms in order to solve them. The design and derivation of controllers based on adaptive control, optimal control and reinforcement learning will be discussed in some detail. Furthermore, we address the problem of lifting from the ground an unknown cable-suspended load by a quadrotor aerial vehicle. We combine geometric control with a least-squares estimation method to design an adaptive controller that enables a stable lift maneuver. The last part of the talk presents our recent efforts on cooperative transportation of a cable-suspended payload using multiple aerial robots.

Speaker Bio
Rafael Fierro is a Professor of the Department of Electrical and Computer Engineering, University of New Mexico where he has been since 2007. He received a M.Sc. from the University of Bradford, England and a Ph.D. degree from the University of Texas at Arlington. Prior to joining UNM, he held a postdoctoral appointment with the GRASP Lab at the University of Pennsylvania and a faculty position at Oklahoma State University.

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