

TEXAS A&M ENGINEERING

Seminar

Dwight Look College of Engineering Seminar Series



Mobile Sensor Networks: Cooperative Sensing and Control

Naomi E. Leonard

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Thursday, February 7, 2008, 4:00-5:00 p.m.
Rm. 131 H.R. Bright Building

Coordinated motion control of multi-agent systems makes possible the design of mobile sensor networks to follow and sample features and to provide efficient sampling coverage of time-varying, spatially distributed fields in the environment (sea, land, air, space). In this talk I will describe collaborative work on models for coordinated motion of multi-agent systems based on moving particles with steering control driven by an extension of coupled oscillator dynamics. The methodology provides means for systematic design of simply parameterized families of stable collective motion patterns that can be optimized for sampling. I will describe application to design of an adaptive ocean sampling network and present results from field experiments in Monterey Bay, California. I will also describe connections to modeling and analysis of collective motion and decision making in animal groups.

Naomi Ehrich Leonard is a professor in the Department of Mechanical and Aerospace Engineering and associated faculty member of the Program in Applied and Computational Mathematics at Princeton University where she has been since 1994. In 2001 she was the Lise Meitner Guest Professor at Lund University, Sweden and in 2007 a Visiting Professor at University of Pisa, Italy. She received the B.S.E. degree in mechanical engineering from Princeton University in 1985. From 1985 to 1989, she worked as an engineer in the electric power industry for MPR Associates, Inc. She received the M.S. and Ph.D. degrees in electrical engineering from the University of Maryland, College Park, in 1991 and 1994.

Prof. Leonard's research is in nonlinear control and dynamics with current interests in cooperative control for multi-agent systems, mobile sensor networks, adaptive ocean sampling networks, modeling and analysis of collective motion and decision making in animal aggregations such as fish schools and decision dynamics in mixed human/robot teams. She became an IEEE Fellow in 2007 and received the Mohammed Dahleh Award (2005), John D. and Catherine T. MacArthur Foundation Fellowship (2004), Automatica Prize Paper award (1999), ONR Young Investigator Award (1998) and NSF CAREER Award (1995). She has served as associate editor for *Automatica* and *SIAM Journal on Control and Optimization*.