



**The Center for Control, Dynamical Systems, and Computation
University of California at Santa Barbara
Winter 2008 Seminar Series
Presents**

Architectures, abstractions, and algorithms for large teams of robots

Vijay Kumar

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Monday, March 3, 2008 4:00-5:00pm ESB 1001

Abstract:

Networked robots represent the convergence of robotics, sensor networks and mobile ad-hoc networks, with many applications and a growing market projected to be \$200B in 2013. This talk will focus on the fundamental problems and practical issues underlying the deployment of large numbers of autonomously functioning robots. The central problem is the so-called inverse problem of deriving individual robot behaviors for a desired group behavior. There are numerous examples of group behavior in biology which suggest that analysis of swarming behaviors in biology may provide insight for the synthesis of collective behaviors for engineered systems. I will present a methodology for modeling and analyzing such collective behaviors and discuss architectures, abstractions and algorithms for the control of large networks of robots.

About the Speaker:

Vijay Kumar received his M.Sc. and Ph.D. in Mechanical Engineering from Ohio State University in 1985 and 1987 respectively. He has been on faculty in the Department of Mechanical Engineering and Applied Mechanics with a secondary appointment in the Department of Computer and Information Science at the University of Pennsylvania since 1987. He is currently the UPS Foundation Professor and the Chairman of Mechanical Engineering and Applied Mechanics. Dr. Kumar served as the Deputy Dean of the School of Engineering and Applied Science from 2000-2004. He directed the GRASP Laboratory, a multidisciplinary robotics and perception laboratory, from 1998-2004. He is a co-founder of Bio Software Systems, a start-up company in Camden commercializing novel software tools for the analysis of regulatory networks.

Dr. Kumar's research interests lie in the area of robotics and networked multi-agent systems. He is a Fellow of the American Society of Mechanical Engineers (ASME) and a Fellow of the Institution of Electrical and Electronic Engineers (IEEE). He has served on the editorial board of the IEEE Transactions on Robotics and Automation, Editorial Board of the Journal of Franklin Institute and the ASME Journal of Mechanical Design. He is the recipient of the 1991 National Science Foundation Presidential Young Investigator award, the Lindback Award for Distinguished Teaching, the 1997 Freudenstein Award for significant accomplishments in mechanisms and robotics and the 2004 IEEE International Conference on Robotics and Automation Kawamori Best Paper Award. He is also a Distinguished Lecturer in the IEEE Robotics and Automation Society and an elected member of the Robotics and Automation Society Administrative Committee.