Electrical & Computer ENGINEERING

SEMINAR

DISTINGUISHED LECTURE

THURSDAY
MARCH 2, 2006

Scaife Hall Auditorium
Room 125

4:00 PM
Refreshments—3:30 PM

P.R. KUMAR

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P. R. Kumar received his B. Tech. in Electrical Engineering (Electronics) from I.I.T. Madras in 1973, and his M.S. and D.Sc. in Systems Science and Mathematics from Washington University, St. Louis, in 1975 and 1977, respectively. Since 1985 he has been at the University of Illinois, Urbana-Champaign, where he is currently Franklin W. Woeltge Professor of Electrical and Computer Engineering, and a Research Professor in the Coordinated Science Laboratory.

He is a Fellow of the IEEE. He received the Donald P. Eckman award of the American Automatic Control Council, and is the recipient of the 2006 IEEE Field Award in Control Systems. He is a coauthor of the book, *Stochastic Systems: Estimation, Identification and Adaptive Control* with Pravin P. Varaiya.

He serves on the Editorial Boards of IEEE Transactions on Mobile Computing, Foundations and Trends in Networking, and ACM Transactions on Sensor Networks, and is an Editor for *Communications in Information and Systems* and an Associate Editor for *Mathematics of Control Signals and Systems* and *Mathematical Problems in Engineering: Problems, Theories and Applications*.

He has worked on problems in game theory, adaptive control, stochastic control, simulated annealing, neural networks, machine learning, queuing networks, manufacturing systems, scheduling, and wafer fabrication plants. His current research interests are in wireless networks, sensor networks, and the convergence of control, communication and computation.

TOWARDS A THIRD GENERATION OF CONTROL SYSTEMS

If the first generation of control systems can be regarded as analog control, and the second generation as digital control, then we may be on the cusp of what could be called the third generation of control systems. Due to the rapid technological changes of the past decade, there is the possibility of deploying distributed control systems consisting of sensors and actuators connected by shared wired or wireless networks, and involving powerful computational nodes as well as software services.

We will address the issue of how to facilitate the proliferation of such next generation control systems, explore the issue of what are the appropriate abstractions and what is the matching architecture for the (re)convergence of control with communication and computation, and propose an abstraction of Virtual Collocation to be manufactured by the supporting middleware. We will advocate a principle of local temporal autonomy for enhancing reliability and provide an overview of efforts in the Convergence Laboratory at the University of Illinois.

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