

UTC Institute for Advanced Systems Engineering Distinguished Lecture Series



Dr. Sanjoy K. Mitter (MIT)
Laboratory for Information and Decision Systems

On Some Connections between Nonlinear Filtering, Information Theory and Statistical Mechanics

Thursday, November 6th, 2014 8:30 a.m. – 11:30 a.m. & 1:00 p.m. – 3:00 p.m.
UConn Storrs Campus, Student Union Theater

Abstract:

- 1) Some basic concepts in Probability Theory and Information Theory
- 2) Stochastic Linear Dynamical Systems. Kalman Filtering from the Innovations viewpoint.
- 3) Dissipative Systems (J.C. Willems). Kalman Filter as an Informally Dissipative System. Information Optimality of the Kalman Filter. Nonlinear Generalization.
- 4) Introduction to Statistical Mechanics. The Ising Model. Variational Description of Gibbs Measures. Bayesian Inference as Free Energy Minimization. The Duality between Estimation and Control.
- 5) Markov Chain Monte Carlo and Particle Filtering.

Speaker Bio: Sanjoy K. Mitter received his Ph.D. degree from the Imperial College of Science and Technology in 1965. He taught at Case Western Reserve University from 1965 to 1969. He joined MIT in 1969 where he has been a Professor of Electrical Engineering since 1973. He was the Director of the MIT Laboratory for Information and Decision Systems from 1981 to 1999. He has also been a Professor of Mathematics at the Scuola Normale, Pisa, Italy from 1986 to 1996. He has held visiting positions at Imperial College, London; University of Groningen, Holland; INRIA, France; Tata Institute of Fundamental Research, India and ETH, Zurich, Switzerland; and several American universities. Professor Mitter was chosen as the recipient of the IEEE Eric E. Sumner Award for 2015. Professor Mitter was the Ulam Scholar at Los Alamos National Laboratories in April 2012 and the John von Neumann Visiting Professor in Mathematics at the Technical University of Munich, Germany from May-June 2012. He was awarded the AACC Richard E. Bellman Control heritage Award for 2007. He was the McKay Professor at the University of California, Berkeley in March 2000, and held the Russell-Severance-Springer Chair in Fall 2003. He is a Fellow of the IEEE and IFAC. He is the winner of the 2000 IEEE Control Systems Award. He was elected a Foreign Member of Istituto Veneto di Scienze, Lettere ed Arti in 2003. In 1988, he was elected to the National Academy of Engineering. His current research interests are Communication and Control in a Networked Environment, the relationship of Statistical and Quantum Physics to Information Theory and Control and Autonomy and Adaptiveness for Integrative Organization.