



Illinois Center for Wireless Systems

ICWS Seminar Series



HOW TO READ YOUR GENES: SIGNAL PROCESSING FOR NEXT-GENERATION SEQUENCING & BIOSENSING

Professor Haris Vikalos
Electrical and Computer Engineering
The University of Texas at Austin

Wednesday, April 18, 2012
4:00 p.m.
141 Coordinated Science Lab

Abstract: Next-generation DNA sequencing technology will help determine an individual's susceptibility to a broad range of chronic and acute diseases or disorders, enable the discovery and clinical testing of new pharmaceutical products, and generally personalize and improve the delivery of health care. In this talk, I will discuss the use of concepts from signal processing in the acquisition and analysis of next-generation sequencing data. Following a brief overview of state-of-the-art sequencing technology, I will present some recent results on modeling, optimal base calling, error correction, and analytical characterization of the achievable performance of sequencing-by-synthesis. The results demonstrate beneficial effects of the developed base calling and error correction techniques on downstream applications. In the second part of the talk, I will discuss signal processing aspects of real-time affinity biosensors which are capable of temporally sampling the process of binding between molecular targets and their probes. The results on modeling, inference, and limits of performance demonstrate significant performance improvements over conventional affinity biosensors.

Bio: Haris Vikalo received the B.S. degree from the University of Zagreb, Croatia, in 1995, the M.S. degree from Lehigh University in 1997, and the Ph.D. degree from Stanford University in 2003, all in electrical engineering. He held a short-term appointment at Bell Laboratories, Murray Hill, NJ, in the summer of 1999. From January 2003 to July 2003 he was a Postdoctoral Researcher, and from July 2003 to August 2007 he was an Associate Scientist at the California Institute of Technology. Since September 2007, he has been with the Department of Electrical and Computer Engineering, the University of Texas at Austin, where he is currently an Assistant Professor. He is a recipient of the 2009 National Science Foundation Career Award. His research interests include genomic signal processing, stochastic signal processing, and communications.

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