THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

Decoding Genetic Variations:
Algorithms for Single Individual Haplotyping
by
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Date	**:**	**5 May, 2017 (Friday)**
Time	**:**	**3:00 - 4:00pm**
Venue	**:**	**Room 1009, William M.W. Mong Engineering Building**
		The Chinese University of Hong Kong

Abstract
Rapid advances in high-throughput DNA sequencing have enabled unprecedented studies of genetic variations. Information about variations in the genome of an individual is provided by haplotypes, ordered collections of polymorphisms on a chromosome. Knowledge of haplotypes is instrumental in finding genes associated with diseases, drug development and evolutionary studies. Haplotype assembly from high-throughput sequencing data is an NP-hard problem rendered challenging due to errors and limited lengths of sequencing reads. Our key observation is that the minimum error-correction formulation of the haplotype assembly problem is identical to the task of deciphering a coded message received over a noisy channel – a classical problem in the mature field of communication theory. Exploiting this connection, we develop novel haplotype assembly schemes and study the problem from an information-theoretic perspective. An alternative formulation of haplotype assembly as a structured tensor factorization will also be discussed, and performance guarantees on an alternating minimization heuristic will be provided.

Biography
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 Associate Professor. He is a recipient of the 2009 National Science Foundation Career Award. His research interests include signal processing, machine learning, bioinformatics, and communications.

** ALL ARE WELCOME **