THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar

Computer-Aided Investigation of Information-Theoretic Limits: An Overview
by
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Date : **6 June 2024 (Thursday)**
Time : **11:00 am – 12:00 pm**
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Abstract
The linear programming (LP) formulation of information measures provides a solid mathematical framework to identify the fundamental limits of information systems computationally. A critical issue of this approach is however its high computational complexity. To reduce the computation burden of this approach, we can utilize the symmetry structure in such systems. The strength of the symmetry-reduced approach is illustrated in several well-known difficult problems, such as regenerating codes, coded caching, and private information retrieval, which provides new and non-trivial outer bounds. In addition to rate bounds, more in-depth studies can be conducted on the joint entropy structure of these computed bounds, which often lead to reverse-engineered novel code constructions and further allow disproving linear code achievability. Finally, we discuss two new directions: the first is to allow the utilization of non-Shannon-type inequalities in the computational approach, and the second is to convert the original LP into a sequence of smaller LPs, both of which appear to be awaiting certain suitable machine-learning techniques

Biography
Dr Chao Tian received the B.E. degree in Electronic Engineering from Tsinghua University, Beijing, China, and the M.S. and Ph. D. degrees in Electrical and Computer Engineering from Cornell University, Ithaca, NY. Dr. Tian was a postdoctoral researcher at Ecole Polytechnique Federale de Lausanne (EPFL), then a member of technical staff--research at AT&T Labs--Research, an Associate Professor in the Department of Electrical Engineering and Computer Science at the University of Tennessee Knoxville, and is now an Associate Professor in the Department of Electrical and Computer Engineering at Texas A&M University. His authored and co-authored papers received the 2014 IEEE Data Storage Best Paper Award, the 2017 IEEE Jack Keil Wolf ISIT Student Paper Award, and the 2020-2021 IEEE Data Storage Best Student Paper Award. He was an Associate Editor for the IEEE Signal Processing Letters 2012-2014, an Editor for the IEEE Transactions on Communications 2016-2021, and an Associate Editor for the IEEE Transactions on Information Theory 2021-2023. He is a general co-chair of 2024 IEEE Information Theory Workshop.

** ALL ARE WELCOME **

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