



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

**Beyond Dithered Quantization: Optimal Redundancy and
Practical Codes for Exact Channel Synthesis**

By
Prof. Aaron B. Wagner
Cornell University, USA

Date : 22 November 2024 (Friday)

Time : 10:30am – 11:30am

Venue : Rm 801, Ho Sin Hang Engineering Building, CUHK

Abstract

We consider the problem known as channel simulation or channel synthesis, i.e., the problem of using a unidirectional noiseless channel between two parties to simulate a noisy channel with the help of common randomness. In the i.i.d. case, existing schemes provide an upper bound on the unnormalized redundancy that is logarithmic in the block length. We provide an improved scheme that halves the logarithmic term for some channels and eliminates it entirely for all others. For full-support discrete memoryless channels, we show that this is the best possible. We also show how practical schemes can be developed to simulate symmetric binary-output channels using polar codes. Joint work with Sharang Sriram, Rochelle Barsz, and Beth Polito.

Biography

Aaron Wagner is Professor and Stephen H. Weiss Presidential Fellow in the School of Electrical and Computer Engineering at Cornell University. He received the B.S. degree from the University of Michigan, Ann Arbor, and the M.S. and Ph.D. degrees from the University of California, Berkeley, after which he was a Postdoctoral Research Associate in the Coordinated Science Laboratory at the University of Illinois at Urbana-Champaign. He has received the NSF CAREER award, the U.C. Berkeley EECS David J. Sakrison Memorial Prize, the U.C. Berkeley Bernard Friedman Memorial Prize in Applied Mathematics, the IEEE Information Theory Society James L. Massey Research and Teaching Award for Young Scholars, the IEEE Information Theory Society Paper Award, and teaching awards at the Department, College, and University level at Cornell. He will serve as President of the IEEE Information Theory Society in 2025.

**** ALL ARE WELCOME ****