



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



## Coding Theory for Reliable Signal Processing

by

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**Date : 29 January 2015 (Thursday)**  
**Time : 11:00am - 12:00pm**  
**Venue : Room 833, Ho Sin Hang Engineering Building**  
**The Chinese University of Hong Kong**

### Abstract

In this talk, we showed how coding theory based techniques can be used to ensure reliable signal processing. We presented our coding theory based technique (DCFEC) which can be used in various signal processing applications to handle erroneous data from agents. Humans can also be modeled as sensors through social media data and in doing so, we can consider a system consisting of agents who would have some elements of human computation models and some elements of WSN models. In this way, we can consider a generalized framework which covers various applications. By considering the examples of distributed classification, target localization and crowdsourcing, we presented schemes that use DCFEC technique to handle faults by sensors, falsified data due to malicious sensors (Byzantines), and unreliable data from anonymous crowd workers. Note that many other applications fit the framework described in this talk where reliable processing could be ensured by our coding theory based approach.

### Biography

Yungxiang S. Han received B.Sc. and M.Sc. degrees in electrical engineering from the National Tsing Hua University, Taiwan, in 1984 and 1986, respectively, and a Ph.D. degree from the School of Computer and Information Science, Syracuse University, NY, in 1993. He was with Hua Fan College of Humanities and Technology, National Chi Nan University, and National Taipei University, Taiwan. From August 2010, he is with the Department of Electrical Engineering at National Taiwan University of Science and Technology.

Dr. Han's research interests are in error-control coding, wireless networks, and security. Dr. Han has conducting state-of-the-art research in the area of decoding error-correcting codes for more than sixteen years. He first developed a sequential-type algorithm based on Algorithm A\* from artificial intelligence. At the time, this algorithm drew a lot of attention since it was the most efficient maximum-likelihood decoding algorithm for binary linear block codes. Dr. Han has also successfully applied coding theory in the area of wireless sensor networks. He has published several highly cited works on wireless sensor networks such as random key pre-distribution schemes. He also serves as the editors of several international journals.

Dr. Han was the winner of the Syracuse University Doctoral Prize in 1994 and a Fellow of IEEE. One of his papers won the prestigious 2013 ACM CCS Test-of-Time Award in cybersecurity to recognize its significant impact on the security area over ten years.

**\*\* ALL ARE WELCOME \*\***