



Bilkent EEE

Bilkent EEE Distinguished Seminar Series

Bilkent University - Department of Electrical and Electronics Engineering



Deviation from the standard: Toward opening-up 5G telecommunications

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Much of the recent debate on the adoption of 5G wireless technology has centered on the issue of standards. To maintain data integrity in the face of network unreliability, systems rely on error-correcting codes. System standardization is predicated on co-designing these error-correcting codes and, most importantly, their generally complex decoders, into efficient, dedicated and customized chips.

In this talk, we shall discuss "Guessing Random Additive Noise Decoding," or GRAND. This is a new method developed by Duffy, Médard and their research groups, which has shown that universal, code-agnostic decoding is possible for low to moderate redundancy settings in wireless technology. Moreover, recent work with Yazicigil and her group demonstrated that such decoding could be implemented with extremely low latency in silicon, processing a high volume of data with minimal delay. GRAND enables a new exploration of codes, in and of themselves, independently of tailored decoders, over a rich family of code designs, including random ones.

Médard and Duffy's groups' investigation reveals that even the simplest of codes, such as those currently used for error checking, do as well as state-of-the-art codes. Since multi-code encoders are readily constructed, we may consider, freed from dedicated decoders, to remove standardization in codes.

Bio: Muriel Médard is the Cecil H. and Ida Green Professor in the Electrical Engineering and Computer Science (EECS) Department at MIT, where she leads the Network Coding and Reliable Communications Group in the Research Laboratory for Electronics. She obtained three Bachelors degrees (EECS 1989, Mathematics 1989 and Humanities 1991), as well as her M.S. (1991) and Sc.D (1995), all from MIT. She is a Member of the US National Academy of Engineering (elected 2020), a Fellow of the US National Academy of Inventors (elected 2018), American Academy of Arts and Sciences (elected 2021), and a Fellow of the Institute of Electrical and Electronics Engineers (elected 2008). She holds an Honorary Doctorate from the Technical University of Munich (2020).

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