Department of Mathematics and Statistics Colloquium

Coding techniques for modern storage

Job Candidate

Abstract: Coding theory is the study of reliable communication over unreliable channels, including storage channels. This talk will focus on coding problems inspired by the structure of flash memory storage devices. After a brief introduction to classical coding theory and the flash memory problem, I will discuss two research directions related to this application.

The first is the topic of rewriting codes, which originated in the study of write-once memories. I will introduce a WOM code construction from a family of finite geometries and discuss generalizations.

The second topic is the implementation of error-correcting codes in storage media. In particular, I will discuss low density parity check codes, graph representations, and iterative decoding. This research concerns how arrangements of codeword bits in the memory impacts the probability of decoding error. The analysis for binary codes leads to a design scheme for nonbinary codes that takes advantage of differing bit-error probabilities.

Monday, February 3rd at 3:45 in Roop 103

refreshments at 3:30