



香港中文大學
The Chinese University of Hong Kong

Institute of Theoretical Computer Science and Communications

ITCSC-CSE Joint Seminar

Reed-Muller Codes for Random Errors and Erasures

By

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11:00 am – 12:00 noon

Room 121, 1/F, Ho Sin Hang Engineering Building, CUHK

Abstract:

Reed-Muller codes encode an m -variate polynomial of degree r by evaluating it on all points in $\{0,1\}^m$. Its distance is 2^{m-r} and so it cannot correct more than that many errors/erasures in the worst case. For random errors one may hope for a better result. In his seminal paper Shannon exactly determined the amount of errors and erasures one can hope to correct for codes of a given rate. Codes that achieve Shannon's bound are called capacity achieving codes. In this talk we will show that Reed-Muller codes of low rate achieve capacity for both erasures and errors. We will also show that for high rate RM codes achieve capacity for erasures. Time permitting we will give an algorithm that for high rate RM codes corrects many more random errors than what minimal distance dictates.

Based on joint works with Emmanuel Abbe and Avi Wigderson and with Ramprasad satharishi and Ben lee Volk.

Biography:

Amir Shpilka obtained his Ph.D. in Computer Science and Mathematics from the Hebrew University in Jerusalem in 2001 under the supervision of Avi Wigderson. From 9.2005 - 9.2014 he was a faculty member at the CS department at the Technion. In 10.2014 he joined the CS department at Tel-Aviv University. His research interests lie in Complexity Theory, mainly in Arithmetic Circuit Complexity.

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

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