

ECE 600 Seminar
April 4, 2011, 3:45 – 4:45PM, EH 1800

Title: *Invisible Traces in Pixels and Bits*

Professor Min Wu, University of Maryland, College Park

Abstract:

Technology advancement and widespread use of digital imaging devices have brought about a number of forensic and provenance questions, including by what device an image was generated; where an image was from; what has been done on the image since its creation, by whom, when and how. Invisible traces are being explored by the technical community to manage and protect multimedia information and devices in the digital era. This talk will discuss some recent research carried out by our Media and Security Team (MAST) at University of Maryland to empower Sherlock Holmes in the Digital Era. The first type of digital fingerprint addresses unauthorized leak and re-distribution of multimedia data. A unique signal or ID representing a receiving user is first embedded into the media data and then the fingerprinted content is distributed to the user. These track-and-trace fingerprints should be resilient to not only attacks mounted by an individual, but also attacks by multiple users, who work together to generate a new version to remove their fingerprints and circumvent the protection. Our research on anti-collusion fingerprinting finds applications ranging from military and government operations to piracy deterrence for copyrighted multimedia. Different from the approaches that rely on proactive data embedding, an emerging type of fingerprints explores inherent traces left by the devices or processing systems a multimedia document has gone through. By employing such "intrinsic fingerprints", we can perform non-intrusive forensic analysis to determine the origin and processing history of digital images. The third type of digital fingerprint provides a content-based compact representation of a media document. In addition to applications in content search and piracy identification accompanying the increasing popularity of YouTube/Google, properly secured content fingerprints also play an important role in content authentication and secure watermarking. If time permits, I'll briefly discuss our research on content fingerprinting.

Biography:

Dr. Min Wu received the B.E. degree in electrical engineering and the B.A. degree in economics in 1996 from Tsinghua University in Beijing, China (both with the highest honors), and the Ph.D. degree in electrical engineering from Princeton University in 2001. Since 2001, she has been with University of Maryland, College Park, where she is currently an Associate Professor. Dr. Wu leads the Media and Security Team (MAST) at University of Maryland, with main research interests on information security and forensics and multimedia signal processing. She has co-authored two books and holds eight U.S. patents on multimedia security and communications. She is a co-recipient of two Best Paper Awards from the IEEE Signal Processing Society and EURASIP, respectively. She also received a NSF CAREER award in 2002, a TR100 Young Innovator Award from the MIT Technology Review Magazine in 2004, an ONR Young Investigator Award in 2005, a Computer World "40 Under 40" IT Innovator Award in 2007, and an IEEE Mac Van Valkenburg Early Career Teaching Award in 2009. She is currently serving as Vice President - Finance of the IEEE Signal Processing Society, Vice Chair of the IEEE Technical Committee on Information Forensics and Security, and involved in several technical committees and journals. She was elected IEEE Fellow for contributions to multimedia security and forensics. [URL: <http://www.ece.umd.edu/~minwu/>].