Eva C. Song

CONTACT INFORMATION

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U.S. Permanent Resident

EDUCATION

Princeton University, NJ USA — September 2010-present

Ph.D. Candidate, Electrical Engineering **GPA** 3.83/4.0
(expected graduation date: August 2015)
M.A. received September 2012

Thesis Advisors: Paul W. Cuff, H. Vincent Poor

Carnegie Mellon University, Pittsburgh, PA USA — August 2007-December 2009

B.S., Electrical and Computer Engineering **GPA** 3.93/4.0

RESEARCH EXPERIENCE

Department of Electrical Engineering, Princeton University

Joint Source-Channel Coding — Oct 2014-present

- Studied joint source-channel coding in multi-user communication network
- Analyzed joint source-channel coding schemes in rate-distortion based secrecy communication systems

Lossy Source Compression — June 2013-present

- Studied the use of likelihood encoder in various source coding problems
- Studied the fundamental limit of source compression with side information under reliability and secrecy constraints

Source Channel Secrecy — July 2011-June 2013

- Studied secrecy of Gaussian source compression
- Studied the fundamental limit of transmitting messages over noisy broadcast channel under certain reliability and security constraints
- Studied source coding limit with presence of eavesdropper and secret key sharing between transmitter and intended receiver using rate-distortion theory

Department of Electrical and Computer Engineering, Carnegie Mellon University

Research Assistant, full-time — January-June 2010
Data Storage Systems Center, undergraduate research — Advisor: James Bain

- Conducted calculations for an electromagnetic system
- Modeled and analyzed dynamic performance of microactuator for application of hard disk drive using COMSOL and MATLAB

Damage Detection in Pipeline — September-December 2009
Signal Processing, undergraduate research — Advisor: José Moura

- Studied time reversal theory for damage detection
- Implemented time reversal algorithm in MATLAB and performed experimental measurements

Thermo-Optical Modeling of Near Field Optical Sources — January-June 2009
Data Storage Systems Center, undergraduate research — Advisor: James Bain

- Modeled and analyzed near field optical sources using COMSOL and MATLAB for application in heat assisted magnetic recording (HAMR)

TEACHING EXPERIENCE

TA COS-126 General Computer Science	Princeton University	FALL 2012
TA ELE-301 Circuits and Signal Processing	Princeton University	FALL 2011
TA 18-300 Fundamentals of Electromagnetism	Carnegie Mellon University	FALL 2009
TA 18-220 Electrical Engineering	Carnegie Mellon University	FALL 2008

Professional Experience

Alcatel-Lucent — NJ, USA
Intern, Bell Labs Research — June-September 2012

- Jointly worked with Communication and Signal Processing group and Optics group on MIMO optical communication security project
- Studied and derived fundamental mathematical limits in multimode fiber communication in presence of eavesdropping
- Applied theoretical results to physical model and wrote MATLAB code to simulate

DAT Group — Beijing, China
Intern, Software Engineer — June-August 2008

- Developed banking and public transportation applications for smart card and reader using C++

Mentoring Experience

Department of Electrical Engineering, Princeton University
Side Channel Attack in Cache-Timing — FALL 2012

- Mentored senior undergraduate student in electrical engineering conducting research in analysis of cache-timing attack

Publications

E. C. Song, P. Cuff and H. V. Poor, Joint Source-Channel Secrecy Using Hybrid Coding, IEEE International Symposium on Information Theory, Hong Kong. June 2015

E. C. Song, P. Cuff and H. V. Poor, A Rate-Distortion Based Secrecy System with Side Information at the Decoders, IEEE 52nd Annual Allerton Conference on Communication, Control, and Computing, IL. October 2014

E. C. Song, P. Cuff and H. V. Poor, The Likelihood Encoder for Lossy Compression, submitted to IEEE Trans. on Information Theory, August 2014

E. C. Song, P. Cuff and H. V. Poor, The Likelihood Encoder for Lossy Source Compression, IEEE International Symposium on Information Theory, Honolulu, HI. June 2014

E. C. Song, E. Soljanin, P. Cuff, H. V. Poor and K. Guan, Rate-Distortion-Based Physical Layer Secrecy with Applications to Multimode Fiber, IEEE Trans. on Communications, vol.62, no.3, pp.1080,1090, March 2014

P. Cuff and **E. C. Song**, The Likelihood Encoder for Source Coding, IEEE Information Theory Workshop, Seville, Spain. September 2013

E. C. Song, P. Cuff and H. V. Poor, A Bit of Secrecy for Gaussian Source Compression, IEEE International Symposium on Information Theory, Istanbul, Turkey. July 2013

K. C. Guan, **E. C. Song**, E. Soljanin, P. J. Winzer and A. M. Tulino, Physical Layer Security in Space-Division Multiplexed Fiber Optic Communications, IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA. November 2012

C. Schieler, **E. C. Song**, P. Cuff and H. V. Poor, Source-Channel Secrecy with Causal Disclosure, IEEE 50th Annual Allerton Conference on Communication, Control, and Computing, IL. October 2012

Other Presentations

E. C. Song, P. Cuff and H. V. Poor, The Likelihood Encoder with Applications to Lossy Compression and Secrecy, Information Theory and Applications Workshop, La Jolla, CA. February 2015

E. C. Song, P. Cuff and H. V. Poor, A Bit of Secrecy for Gaussian Source Compression, North American School of Information Theory, Purdue University, West Lafayette, IN. June 2013

E. C. Song, E. Soljanin, K. C. Guan and P. J. Winzer, Imperfect Information Theoretic Secrecy for Multimode Fiber, DIMACS Workshop on Information-Theorectic Network Security, Rutgers, NJ. November 2012

Honors and Awards

Wu Prize for Excellence, Princeton University	2014
Eta Kappa Nu, Electrical and Computer Engineering Honor Society	Since 2008
Tau Beta Pi, Engineering Honor Society	Since 2008
Graduated with Honor, Carnegie Mellon University	May 2010
Dean's List, Carnegie Mellon University	2007-2009

Services

Society of Women Engineers Conference (SWE 14) — Los Angeles, CA
Recruiter — Oct 2014
- Volunteered to recruit for Princeton University School of Engineering and Applied Science

Conference on Information Sciences and Systems (CISS) — Princeton, NJ
Volunteer — March 2014, 2012
- Volunteered to help with technical support during conferences

Symposium on Modeling and Optimization in Mobile, Ad Hoc,and Wireless Networks (WiOpt) — Princeton, NJ
Volunteer — May 2011
- Volunteered to help with registration and technical support during conference

Computer Skills

- Languages: C/C++, Java, Python, MATLAB, R, HTML
- OS: Linux/Unix, MacOS X, Windows, iOS, Android

References

Prof. Paul Cuff
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Prof. Vincent Poor
Dean, School of Engineering and Applied Science, Princeton University
poor@princeton.edu
609-258-1816

Prof. Sergio Verdú
Department of Electrical Engineering, Princeton University
verdu@princeton.edu
609-258-5315