Ethan R. Elenberg

CONTACT INFORMATION

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RESEARCH INTERESTS

Graph Algorithms, Machine Learning, Image Processing, Index Coding, Distributed Storage

EDUCATION

The University of Texas, Austin, TX

Ph.D., Electrical and Computer Engineering

M.S., Electrical and Computer Engineering, May 2014 GPA: 3.9/4.0

- Research Supervisors: Sriram Vishwanath and Alexandros G. Dimakis
- Academic Track: Communications, Networks, and Systems (CommNetS)

The Cooper Union for the Advancement of Science and Art, New York, NY

B.E., Electrical Engineering, May 2012 GPA: 4.0/4.0

- Full Tuition Scholarship, 2008-2012
- *Summa Cum Laude*
- Signal Processing & Communications Track
- Minor in Mathematics

SECURITY CLEARANCE

Last active August 2014, information available upon request.

WORK EXPERIENCE

Graduate Research Assistant, The University of Texas *August 2013 - Present*

- Member of Wireless Networking & Communications Group, LINC group.
- Designing distributed approximation algorithms for graph analytics.
- Developing tools to analyze and visualize brain connectivity using task-based fMRI.

Summer Research Intern, MIT Lincoln Laboratory *May 2014 - August 2014*

- Formulated and developed novel entropy-based autofocus algorithms for nearfield SAR.
- Evaluated performance on simulated, emulated, and measured SAR data.

Wireless Intern, Apple *May 2013 - August 2013*

- Developed an EVM analysis tool for cellular QPSK signals.
- Provided factory support during an iPhone build.

Summer Research Intern, MIT Lincoln Laboratory *June 2012 - August 2012*

- Implemented extended and unscented Kalman filters in MATLAB for passive target tracking applications.
- Developed and tested a proof-of-concept passive RF direction finding circuit.

S*PROCOM ^{2} Research Fellow, The Cooper Union *August 2011 - May 2012*

- Assisted with Cognitive Communications Gateway Engine software development.
- Implemented Voice over IP transcoding for software defined radio applications.

Student Engineer, Southwest Research Institute *May 2011 - August 2011*

- Developed image processing software in C for a 4-slap fingerprint reader.
- Assisted in mapping high-level algorithms to an embedded FPGA implementation.
- Implemented adaptive filtering, AR inverse model, and NPR filter bank algorithms in MATLAB for audio processing.

Audio/Visual Technician, The Cooper Union *September 2008 - May 2011*

- Operated sound for Great Hall events and audio/visual equipment for classes.
- Supervised movement of equipment to the New Academic Building.

Quantitative Research Intern, The Millburn Corporation *May 2010 - January 2011*
- ◇ Developed financial models and parallel computing clusters in both R and S-PLUS.

Math Tutor, The Cooper Union *October 2009 - February 2010*
- ◇ Assisted individual students with Intro to Linear Algebra concepts and homework.

TECHNICAL SKILLS

- ◇ **Programs:** Cygwin, Git, GNU Radio, GraphLab PowerGraph, MATLAB, Mercurial, MPLAB, Microsoft Office, Perforce, S-PLUS, Spark, SPICE, Spyder, TinyOS, Visual C#, Xcode, Xilinx ISE, Unix Shell
- ◇ **Languages:** C, C++, CUDA C, Motorola DSP 563xx assembly, HTML, LaTeX, NumbaPro, Objective C, PIC assembly, Python, R, Scala, VHDL
- ◇ **Algorithms:** Adaptive filtering, backprojection imaging, correlation clustering, CoSaMP, graph-based visual saliency, greedy forward regression, image interpolation, k-means clustering, locality sensitive hashing, Luby transform coding, nonlinear Kalman filtering, 802.11 Physical Layer, sparse PCA, stochastic gradient descent, support vector machines, triangle counting, WiMAX Physical Layer, zig-zag and replacement product
- ◇ **Laboratory:** Digital multimeter, oscilloscope, vector network analyzer, wideband communication tester

PUBLICATIONS

[1] **E.R. Elenberg**, K. Shanmugam, M. Borokhovich, and A.G. Dimakis. "Distributed Estimation of Graph 4-profiles", in *Proc. World Wide Web Conference*, April 2016.

[2] **E.R. Elenberg**, K. Shanmugam, M. Borokhovich, and A.G. Dimakis. "Beyond Triangles: A Distributed Framework for Estimating 3-profiles of Large Graphs", in *Proc. ACM KDD*, August 2015.

[3] J.I. Tamir, **E.R. Elenberg**, A. Banerjee, and S. Vishwanath. "Wireless Index Coding Through Rank Minimization", in *Proc. IEEE ICC*, Sydney, Australia, June 2014.

[4] J.L. Baylon, **E.R. Elenberg**, and S.G. Massengill. "iSCISM: interference Sensing and Coexistence in the ISM Band", *High Frequency Electronics*, vol. 11 no. 4 pp. 30-46, Apr. 2012.

PRESENTATIONS

[5] "Graph Profiles: Algorithms and Approximation Guarantees", *2016 SIAM Conference on Discrete Mathematics*, Atlanta, GA. Invited Speaker.

[6] "Kaggle Competitions." EE379K: Architectures for (Big) Data Science, UT Austin, Spring 2016. Guest Lecture.

[7] "iSCISM: interference Sensing and Coexistence in the ISM Band," *2012 NEWSDR Workshop*, Boston, MA. Poster.

ACADEMIC WORK

- ◇ Restricted Strong Convexity and Weak Submodularity — 2016
- ◇ Triangle Sparsifier Bounds via Stein's Method — Fall 2015
- ◇ A Distributed Framework for Estimating k-profiles of Large Graphs — 2014-2015
- ◇ Video Saliency: Algorithms and Architectures — Spring 2014
- ◇ Locality Sensitive Hashing Families for Large-Scale Image Compression — 2013-2014
- ◇ Multihop Interference Alignment — Spring 2013
- ◇ Dimensionality Reduction with Expander Graphs — Fall 2012
- ◇ iSCISM: interference Sensing and Coexistence in the ISM band — 2011-2012
  - – *First Place* - IEEE Region 1 Student Paper Competition
  - – Sponsored by *ITT Exelis*
- ◇ Rateless LT Code Simulation for Visible Light Communication Channels — Spring 2012
- ◇ Performance Evaluation of WiMAX in Urban Fading Channels — Spring 2012
- ◇ MATLAB Implementation of MPEG-1 Audio Layer 1 Compression — Fall 2010
- ◇ Development of a Vinyl Playback Simulator — 2010
- ◇ Construction of a Morse Code Decoder — Spring 2009

GRADUATE COURSEWORK

Adaptive Filters, Advanced Probability, Classical Coding Theory, Digital Video, Introduction to Compressive Sensing, Introduction to System Theory, Large-Scale Learning, Machine Learning for Large-Scale Data, Optoelectronic Devices, Postmodern Coding Theory, Probability & Random Processes I, Randomized Algorithms, Wavelets & Multiresolution Imaging, Wireless Communications, Wireless System Design

HONORS AND AWARDS

The University of Texas

- Cockrell School Fellowship — 2012-2016
- Microelectronics & Computer Development Fellowship — 2012-2013

The Cooper Union

- Dean's List — Fall 2008 - Spring 2012
- Harold S. Goldberg Leadership Prize — May 2012
- Irwin L. Lynn Memorial Prize in Mathematics — May 2012
- Radio Club of America Scholarship — March 2012
- Abdul Azimi Memorial Scholarship — November 2011
- C.V. Starr Scholarship — October 2011
- Jesse Sherman Book Award in Electrical Engineering — September 2011
- Barry Federman SAME Scholarship — October 2010

MEMBERSHIPS

- Student Member, IEEE — 2011-Present
- Reviewer, ISIT — 2016
- Reviewer, NIPS — 2015
- Reviewer, DySPAN — 2014
- Reviewer, Globecom Communication Theory Symposium — 2013
- Member, Tau Beta Pi — 2010-Present
- Member, Order of the Engineer — 2012-Present
- President, Eta Kappa Nu — 2011-2012
- President, Pro Musica — 2010-2012
- Musical Director, Cooper Dramatic Society — 2009-2011