Eric Lei

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RESEARCH INTERESTS

Digital communications, signal processing, machine learning, high-performance computing.

EDUCATION

Cornell University Aug. 2016 – Present
B.S. *Electrical and Computer Engineering* *Ithaca, NY*
Minors in *Computer Science* and *Applied Mathematics*
G.P.A. 3.86

Relevant Coursework: Digital Signal Processing, Digital Communications, Information Theory, Machine Learning, Random Processes, Numerical Analysis/Optimization, Computer Architecture, ASIC Design

EXPERIENCE

VLSI Information Processing Group Feb. 2018 – Present
Undergraduate Researcher with Prof. Christoph Studer *Ithaca, NY*

- Positioning and localization in multi-antenna wireless systems
- Developed novel supervised and unsupervised inference models using Siamese neural networks to obtain location information from channel-state-information
- Research presented at the 57th Annual Allerton Conference in September 2019

Guinness Research Group Sep. 2019 – Present
Undergraduate Researcher with Prof. Joe Guinness *Ithaca, NY*

- Fast computations for Gaussian process regression via Vecchia's approximation
- Using OpenMP and CUDA for parallelization of backend C++ computations for GpGp, an open source R library for fast Gaussian process approximations and Fisher scoring

MIT Lincoln Laboratory Jun. 2018 – Aug. 2018; May 2019 – Aug. 2019
Summer Research Intern, Group 99: Integrated Systems and Concepts *Lexington, MA*

- Summer 2019: Information theoretic analysis of free space optical communication channels. Frequency and phase-locked loop design for carrier recovery and synchronization. Modeled transmitter and receiver clock mismatch using discrete-event simulations with complete channel statistics.
- Summer 2018: Developed read-out integrated circuit for a novel reconfigurable imaging sensor with applications in optical communications and imaging. Performed RTL design and verification with synthesis/implementation on a Xilinx Ultrascale FPGA.

Computer Systems Laboratory Jun. 2017 – Aug. 2017
Undergraduate Researcher with Prof. Zhiru Zhang *Ithaca, NY*

- Accelerating application performance by using Xilinx Vivado high-level synthesis tools to directly compile C programs to RTL designs on FPGAs.
- Used these techniques to develop FPGA accelerated implementations of cryptographic hash functions such as SHA and AES on a Xilinx Zynq SoC.

PUBLICATIONS AND PRESENTATIONS

E. Lei, O. Castañeda, O. Tirkkonen, T. Goldstein, and C. Studer, "Siamese Neural Networks for Wireless Positioning and Channel Charting," *2019 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Monticello, IL, 2019, pp. 200-207.

E. Lei, O. Castañeda, and C. Studer, "Wireless Positioning via Twin Networks," poster presentation at *Cornell Undergraduate Research Board Symposium*, Ithaca, NY, USA, Spring 2019.

TEACHING

ECE 4670: Digital Communications, *Spring 2020*, TA for *Prof. Peter Doerschuk*.

CS 4780: Machine Learning for Intelligent Systems, *Fall 2019*, TA for *Prof. Thorsten Joachims*.

ECE 2300: Digital Logic and Computer Organization, *Fall 2018*, TA for *Prof. David Albonesi*.

ECE 1210: The Computing Technology Inside Your Smartphone, *Spring 2018–2019*, TA for *Prof. David Albonesi*.

AWARDS

Tau Beta Pi	2019
Eta Kappa Nu	2018
Dean's List	Aug. 2016 – Present

CAMPUS INVOLVEMENT AND OUTREACH

Expanding Your Horizons April 2019
Volunteer *Ithaca, NY*

· Helped under-represented minorities in high school learn about circuits in an educational workshop

Eta Kappa Nu (HKN) Oct. 2018 – Present
Member *Ithaca, NY*

· Led exam review sessions for freshman and sophomore level ECE classes

IEEE Cornell Student Branch Sep. 2018 – Feb. 2019
Corporate Chair *Ithaca, NY*

· Hosted information sessions for companies doing recruiting, professor talks for the student body

Cornell University Engineering Success Jan. 2018 – Dec. 2018
Tutor *Ithaca, NY*

· Tutor for students in CS 2800: Discrete Structures

Cornell Cup Robotics Jan. 2017 – Feb. 2018
Electrical Subteam Member *Ithaca, NY*

· Worked on electronic hardware and software for semi-autonomous R2-D2 robot

TECHNICAL STRENGTHS

Computer Languages	C, C++, MATLAB, Python, Java, Verilog, R, PyMTL
Libraries/Packages	NumPy, SciPy, Tensorflow, Keras, Scikit Learn, OpenMP, CVXPy, PyBind, Rcpp
Tools	Git, Xilinx Vivado, Cadence Innovus