Lawrence Tang

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Education

Carnegie Mellon University | Pittsburgh, PA *2020 - Present*
Ph.D. Electrical and Computer Engineering
Advisors: Prof. Franz Franchetti & Prof. Ken Mai
GPA: 4.00

Cornell University | Ithaca, NY *2016 - 2020*
B.S. Electrical and Computer Engineering
GPA: 3.99

Awards and Honors

Carnegie Institute of Technology Dean's Fellow *Feb. 2020*
Cornell Engineering Learning Initiatives Undergraduate Research Grant *Jan. 2019*
Tau Beta Pi Engineering Honor Society *Oct. 2018*
IEEE-Eta Kappa Nu *Oct. 2018*
Cornell Engineering Learning Initiatives Undergraduate Research Grant *Jan. 2018*

Research Experience

Carnegie Mellon University | Pittsburgh, PA *Aug '20 – Present*
Graduate Student Researcher, Advisors: Prof. Franz Franchetti and Prof. Ken Mai
- Working on VLSI design for FFT based applications

VLSI Information Processing Group | Cornell University *Jun '17 – Present*
Undergraduate Research Assistant, Advisor: Prof. Christoph Studer
- Implemented hardware efficient algorithms for wireless localization using channel state information (CSI) with the approximate nearest neighbor search and Locality-Sensitive Hashing (LSH) methods
- Achieved up to an order of magnitude reduction in computational and hardware complexity with similar positioning accuracy when compared to traditional and neural network approaches
- Designed new neural network based methods for unsupervised localization in Hamming space using CSI

Energy and the Environment Research Laboratory | Cornell University *Sep '19 – May '20*
Undergraduate Research Assistant
- Designed a low cost, IoT-based, appliance level electric meter to enable precise monitoring of real-time electricity usage for better control of distributed energy resources
- Built voltage and current sensing circuits that interface to a Feather microcontroller to compute power measurements and send data through LoRa

MITRE | Bedford, MA *May '18 – Aug '19*
Intern in Positioning, Navigation, and Timing
- Quantitatively analyzed GNSS navigational measurements and errors to assess potential utility of future GNSS satellite capabilities; Evaluated possible areas of improvement and potential solutions to better performance
- Analyzed GNSS signal processing techniques used with adaptive antenna arrays and GPS signals through modeling and simulation
- Performed RF hardware testing in an anechoic chamber to compare computer simulations with experimental results

Publications and Presentations

L. Tang, R. Ghods, C. Studer, "Reducing the Complexity of Fingerprinting-Based Positioning using Locality-Sensitive Hashing," Asilomar Conference on Signals, Systems, and Computers, Nov. 2019

L. Tang, R. Ghods, C. Studer, "Fingerprinting-Based Positioning using Locality-Sensitive Hashing," ELI Undergraduate Research Poster Session, Ithaca, NY, May 2019

L. Tang, R. Ghods, C. Studer, "Fast Approximate Nearest Neighbor Search using the STOne Transform," Cornell Undergraduate Research Board Spring Symposium, Ithaca, NY, May 2018

Projects

Hardware FFT Accelerator | Cornell University *Spring '19*

- Implemented a hardware accelerator with a variable number of butterfly units to perform radix-2 FFTs
- Used a standard-cell-based ASIC toolflow to quantitatively analyze performance, area, and energy of RTL design

VLSI Implementation of 16-bit CORDIC | Cornell University *Spring '19*

- Designed schematics and performed layout of lowest level designs to implement a 16-bit pipelined rotation CORDIC using Cadence Virtuoso; Testing and verification performed using MATLAB and Python scripts
- Built RTL models of our CORDIC design to compare post-synthesis area and timing metrics to our custom layout

Outreach and Volunteer Experience

Eta Kappa Nu (HKN) | Cornell University *Oct. '18 – May '20*

Secretary

- Managed semesterly budget to organize outreach events that promote the ECE community at Cornell
- Hosted exam review sessions for underclassmen in the core ECE courses

Future Leaders Program | MITRE *June '19 – Aug. '19*

Mentor

- Engaged wih high school summer interns in workshops emphasizing personal, academic, and professional development
- Provided insight on future engineering opportunities through technical presentations and various social events

Expanding Your Horizons | Cornell University *April '19*

Mentor

- Assisted in a hands-on workshop about creating sound from light using an Arduino and analog circuit components, part of a day long conference that introduces girls to STEM opportunities

Teaching Experience

Undergraduate Teaching Assistant | Cornell University *Aug. '19 – May. '20*

- ECE 3150: Introduction to Microelectronics
- CS 4780: Machine Learning for Intelligent Systems
- ECE 2300: Digital Logic and Computer Organization
- Held weekly office hours to assist with course projects/labs and homework; graded student homework and exams

Academic Excellence Workshop for Multivariable Calculus | Cornell University *Jan. '17 – Jan. '18*

Facilitator

- Led two hour weekly workshops to review topics and problem solving strategies for Multivariable Calculus
- Prepared weekly practice problem worksheets and solutions for students to prepare for exams

Selected Coursework

Reconfigurable Computing • Complex Digital ASIC Design • Digital VLSI Design • Analog Integrated Circuit Design • Computer Architecture • Wireless Communications • Numerical Analysis • Digital Signal and Image Processing • Machine Learning for Intelligent Systems • Data and Network Science

Skills

Software: MATLAB, Python, C, C++, TensorFlow, Keras, Java

Hardware: Verilog, Vivado HLS, Cadence Virtuoso