Andrew **Tu**

Computer Engineer

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Available for Co-Op July – December 2019

Education

Northeastern University | *Boston, MA* — *May 2020*

Bachelor of Science in Computer Engineering and Computer Science — ***GPA: 3.9/4.0***

- Coursework: Robotics Sensing and Navigation (Grad), Computer Vision (Grad), Algorithms, Object Oriented Design, Computer Systems, Linear Systems, Circuits and Signals, Embedded Design
- Involvement: MIT Ballroom Dance Team, Undergraduate Research, numerous hackathons, IEEE, Toastmasters, SASE

Skills

Programming Python , C++ , C , Javascript|HTML|CSS , Java

Technologies ROS , OpenMP , OpenCV , MATLAB , Git , GNU Make , GDB , Linux , LCM

Hardware IMUs , GPS , XBee Radio Modules , Teledyne Benthos Acoustic Smart Modems , Ethereum Miners

Upcoming **Spring 2019 coursework will consist heavily of grad level robotics and high performance computing classes**

Technical Experience

Flex Innovation and Design Labs — *Milpitas, CA*

Robotics Software Co-op — *July 2018 - Present*

- Designing and implementing entire software system with ROS; working closely with electrical and mechanical sub teams.
- Integrating SLAM functionality into mobile robot system, fusing data from LIDAR, sonar, wheel encoders, and IMU.

Northeastern University Ethereum Research Project — *Boston, MA*

Undergraduate Research Assistant — *Sep. 2017 - April 2018*

- Developing network crawler to study end to end latency of the Ethereum discovery protocol

MIT Lincoln Laboratory — *Lexington, MA*

Co-Op Technical Assistant, Interim Secret Clearance | Group 102 - Open and Embedded Systems — *Jan. 2017—Aug. 2017*

- Parallelized radar signal processing chain in C++ using OpenMP and MPI resulting in 1700% speedup. Work demonstrated hybridized MPI and OpenMP parallelizations met project requirements and reduced development costs.
- Automated benchmarking efforts through python and bash scripts to rapidly test and compare over 350 configurations.
- Leveraged analysis tools from the Intel Parallel Studio Suite and Allinea Forge for debugging and optimization
- Developed and trained SVM Fake News Classifier for Tech. Office Challenge, team placed 3rd overall with $.2\%$ difference in accuracy of top 3 teams

Northeastern Interactive Clustering Engine — *Boston, MA*

Undergraduate Research Assistant **(NSF REU)** — *Jun. 2016 - Aug. 2016*

- Contributed to open source C++ machine learning library using scalable frameworks (Git, Cmake, Google Test.)
- *Software-Engineered Library Development to Support a High Performance Machine Learning Visualization System*, poster presentation for 2016 Data Driven Discovery (D3) REU Site, (Best Overall Design)

Northeastern University Marine Observatory Network — *Boston, MA*

Undergraduate Research Assistant **(NSF REU)** — *Oct. 2015 - Jan. 2017*

- Designed and implemented smart buoy and GUI control system using C++, QT framework, and XBee Radio modules to bridge above water radio network with subsea acoustic network.
- *Bridging the Internet Between Land and Sea*, poster presentation at CUR 2016 REU Symposium, First Presenter
- Implemented MAC protocols in MATLAB on Teledyne Benthos SM-975 Acoustic Smart Modems to advance understanding of modem interactions and compare efficacy of MAC protocols over acoustic channel.
- *Programming Acoustic Modems for Underwater Networking*, published to Embark Undergraduate Engineering Review, First Author
- *Testbed Development and Performance Evaluation of the TARS MAC Protocol for Underwater Acoustic Sensor Networks*, published to MTS/IEEE OCEANS 2016 Conference, Third Author
- Co-authored two papers and gave two major presentations (see personal website for links)

NUCAR Side Channel Attacks *Boston, MA*

Undergraduate Research Assistant *Oct. 2015 - Apr. 2016*

- Developed RSA encryption algorithms in C++ for use in side channel attack on Android application. Presented work:
- *Hacking your Data - The Hard(ware) Way*, poster presentation at 2016 Research, Innovation and Scholarship Expo (RISE) at Northeastern University

Technical Projects

Human Tracking TurtleBot *Boston, MA*

Robotics Sensing and Navigation Project *Spring. 2018*

- Combined LIDAR and camera data through ROS to detect and follow humans around a room on TurtleBot3 platform
- Designed and implemented image processing pipeline through ROS to stream, process, and react to camera sensor data.
- Utilized OpenCV Hog Detection and MobileNet SSD for person detection

Performance Comparison of Dead Reckoning against GPS *Boston, MA*

Robotics Sensing and Navigation Project *Spring. 2018*

- Implemented data collection drivers through LCM to collect data from GPS and 9 DOF IMU in autonomous car while driving in Boston.
- Compared estimate of estimated path based on IMU data to GPS ground truth - one of few students to get partial alignment between dead reckoning and GPS data.

Publications

[1] L. Chase, J. Booth, A. Demosthene, T. Leo, C. Purcell, S. Ridley, A. Tu, X. Li, S. Dong, and D. Kaeli. Software-engineered library development to support a high performance machine learning visualization system. Poster presentation at D3 REU Site, Northeastern University, August 2016.

[2] Z. Marcus, A. Tu, A. Interrante-Grant, S. Mukherjee, and D. Kaeli. Hacking your data - the hard(ware) way. Poster presentation at 2016 RISE, Northeastern University, April 2016.

[3] A. Tu. Bridging the internet between land and sea. Poster presentation at CUR Research Symposium, October 2016. Atrium of NSF HQ.

[4] A. Tu. The development of the nu monet. Presentation at NU Talk, February 2017.

Presentations

[1] L. Chase, J. Booth, A. Demosthene, T. Leo, C. Purcell, S. Ridley, A. Tu, X. Li, S. Dong, and D. Kaeli. Software-engineered library development to support a high performance machine learning visualization system. Poster presentation at D3 REU Site, Northeastern University, August 2016.

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