

MichaelBartling

Graduate Applications Engineer, Arm

contact

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programming

Python, C++, C++11
Julia, Matlab, Verilog
C, Embedded C, R,
SystemC

OS

Arch, Debian,
Windows, mbed OS,

Interests

professional: C++11 development, embedded software, optimization methods, theoretical security, machine learning, data visualization

personal: cooking, 3D CG art (Blender), auto restoration, animation

Experience

Full Time and Internships

Arm

Research Engineer: IoT Services Research
Austin, Texas

2018–Now

- **Developed new software architectures for vastly improving IoT deployments** Ongoing
 - Pioneering "Just in Time" decompression of software modules
 - Exploring novel methods for granular over-the-air firmware updates on LPWAN
 - Attempting to make basic notions of security zero-touch for developers
- **Zero-touch Device Provisioning** Ongoing
 - Proposing new solutions to fundamental problems in massive IoT deployments
 - Working closely with several third party research organizations, silicon manufacturers, and network operators to drive technology towards industry standards.
- **uTensor**. Designed lightweight machine inference capabilities for Cortex M devices. <https://github.com/utensor>.
 - Recently announced tech merger with Googles Tensorflow Lite: <https://twitter.com/JeffDean/status/1126229604224487425>
 - First instance of Machine learning (inference) on the tiniest devices
- **Secure Remote Debugging in Constrained Systems**
- **Lightweight Compression Engines for Constrained Devices**
 - Developed novel compression techniques with bounded predictable performance.
 - Technology transferred into several major ongoing projects
 - Principal inventor on 2 in-flight patents

Arm

Applications Engineer: Developer Experience (DevX)
Austin, Texas

2017–2018

- **uTensor**. Designed lightweight machine inference capabilities for Cortex M devices. <https://github.com/utensor>.
- **Iterative model learning on edge devices** (*In Progress*).
- **SpamBlaster**. Designed domain language specific spam classifier for Mbed ecosystem which significantly outperformed previous system.
- **TheFAQ**. Semi-automatic ontology generator for better search within Arm.
- **Mbed Greenlight** Front end accessibility testing for os.mbed.com
- **Device Health project**.

University
of Texas

Graduate Research Assistant
Austin, Texas

2014–2017

- **Dynamic analysis of Windows malware on networks.** Designed large scale malware analysis engine and virtual machine management system using AWS and MongoDB. Wrote low-overhead system call interceptor for Windows platforms. Developed robust anomaly detection pipeline for Windows malware. This software is basis for **one of the largest dynamic malware analysis ever conducted in academia**, collecting approximately 3400 hours of malicious system call traces.
- **Dynamic analysis of mobile malware on networks.** Built state-of-the-art user trace record and replay system for Android applications, injected key malware categories into common applications, designed intelligent anomaly detectors for Android system calls.
- **Context aware sensing.** Automatic classification of user motion into activities based on smart phone accelerometers. Dynamically *learned* privacy preserving user motion models. Inferring information across untrusted contextual boundaries.

Texas
Instruments

Software Development Intern
Dallas, Texas

Summer 2014

- RFSDK Software development
- Designed end-to-end experiment manager for software-hardware interfacing.
- Designed intelligent LTE frame modeling and generation scripts significantly reducing software/hardware testing times while allowing for dynamic end-user capacity simulations.
- Digital pre-distortion design

Texas
Instruments

Software Development Intern
Dallas, Texas

Winter and Summer 2013

Wireless Backhaul Project

- **Ported Contiki OS** to TI FRAM line microcontrollers. Completely redesigned build system allowing for faster incremental builds. Third party required \$45k and 3 months to port code, I finished porting the code for free in just two weeks in my spare time. Enabled TI to conduct IoT R&D with minimal effort.
- Designed and optimized Line of Sight channel estimation drivers.
- Designed and optimized Line of Sight 2x2 and 4x4 MIMO channel equalizer drivers. Conducted precision study on fixed point versus floating point implementations.

Texas
Instruments

Software Development Intern
Dallas, Texas

Winter 2013

Helped formulate non line-of-sight transmitter chain on C6614 EVM

Texas
Instruments

Software Development Intern
Dallas, Texas

Summer 2012

Designed and optimized Reed Solomon processing chain for TI C6614 EVM

Noteworthy side projects

2018	Doom mbed OS port	Arm
	Simple Doom port for mbed OS because it did not exist	
2018	uTensor Handwriting recognition demo	Arm
	uTensor minimum viable product demo based on simple 2-layer fully connected NN and MNIST. Code: https://github.com/uTensor/utensor-mnist-demo , Video: https://www.facebook.com/neil.tan/videos/10159971829870385/	
Spring 2016	Spatially Hashed Photon Map	UT Austin
	Computer Graphics Final Project. High performance ray tracer with photon mapping support written in C++11. Key idea is that can encode photon aggregation into a data structure at build time rather than render time. Furthermore, can leverage O(1) lookup time during rendering. http://mbartling.github.io/photonMapper/	
Spring 2016	QtLC3 and pyLC3	UT Austin
	Rewrote Yale Patt's LC3 architecture simulator for use in classrooms. Simulator includes full python integration for easy unit testing and grading, and the GUI is written in the Qt5 framework. http://minionhut.com/blog/post/lc3-simulator-overview	

Education

2014– Dec. 2016	M.S. Computer Engineering	The University of Texas at Austin
	Advisor: Mohit Tiwari Context-aware sensing, Dynamic malware analysis, Machine Learning. GPA: 3.8	
2011–2014	Bachelor of Science , Summa Cum Laude	Texas A & M University, College Station
	Electrical Engineering Specialized in Computer Engineering Sub-specialized in Signal Processing and Image Processing. GPA: 3.9	
2009–2011	Advanced High School Diploma	Texas Academy of Mathematics and Science
	<i>UNT, Denton, Texas</i> Graduated high school 2 years early to attend accelerated TAMS program. GPA: 3.89	

Awards

2015	Dell Innovation Award: Hack TX	Austin TX
	Distinguishing style and content in images: The ability to create any Instagram filter.	
2015	2nd Place MDP Hackathon	Athena Health, Austin TX
	Accurate fall prediction and motion state regression using cellphone accelerometer information.	
2014-2017	Departmental Fellowship	Computer Architecture and Embedded Processing, The University of Texas
2014	Summa Cum Laude	Texas A& M University, Electrical and Computer Engineering
2011-2014	President's Endowed Scholar	Texas A& M University, Electrical and Computer Engineering
2011-2014	Boltzman Scholar	Texas A& M University, Electrical and Computer Engineering

Courses

- Convex Optimization
- Large Scale Machine Learning
- Multicore programming
- Parallelism and locality
- Real Time Operating Systems
- Security: Hardware Software Interfaces
- Engineering Programming Languages
- Computer Graphics
- Computer Architecture
- Digital Signal Processing
- Image Processing
- Microprocessor Design
- Advanced Logic Design
- Ultrasound Imaging
- VLSI I