

# Michael Bartling

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	<b>Research Engineer: IoT Services Research</b> Austin, Texas	2018–Now
	<ul style="list-style-type: none"><li>• <b>uTensor</b>. Designed lightweight machine inference capabilities for Cortex M devices. <a href="https://github.com/utensor">https://github.com/utensor</a>.<ul style="list-style-type: none"><li>– Recently announced tech merger with Googles Tensorflow Lite: <a href="https://twitter.com/JeffDean/status/1126229604224487425">https://twitter.com/JeffDean/status/1126229604224487425</a></li></ul></li><li>• <b>Secure Remote Debugging in Constrained Systems</b></li><li>• <b>Lightweight Compression Engines for Constrained Devices</b></li></ul>	
Arm	<b>Applications Engineer: Developer Experience (DevX)</b> Austin, Texas	2017–2018
	<ul style="list-style-type: none"><li>• <b>uTensor</b>. Designed lightweight machine inference capabilities for Cortex M devices. <a href="https://github.com/utensor">https://github.com/utensor</a>.</li><li>• <b>Iterative model learning on edge devices</b> (<i>In Progress</i>).</li><li>• <b>SpamBlaster</b>. Designed domain language specific spam classifier for Mbed ecosystem which significantly outperformed previous system.</li><li>• <b>TheFAQ</b>. Semi-automatic ontology generator for better search within Arm.</li><li>• <b>Mbed Greenlight</b> Front end accessibility testing for <a href="https://os.mbed.com">os.mbed.com</a></li><li>• <b>Device Health project</b>.</li></ul>	

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

- RFS SDK 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	<b>Doom mbed OS port</b>	Arm
	Simple Doom port for mbed OS because it did not exist	
2018	<b>uTensor Handwriting recognition demo</b>	Arm
	uTensor minimum viable product demo based on simple 2-layer fully connected NN and MNIST. Code: <a href="https://github.com/uTensor/utensor-mnist-demo">https://github.com/uTensor/utensor-mnist-demo</a> , Video: <a href="https://www.facebook.com/neil.tan/videos/10159971829870385/">https://www.facebook.com/neil.tan/videos/10159971829870385/</a>	
Spring 2016	<b>Spatially Hashed Photon Map</b>	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. <a href="http://mbartling.github.io/photonMapper/">http://mbartling.github.io/photonMapper/</a>	
Spring 2016	<b>QtLC3 and pyLC3</b>	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. <a href="http://minionhut.com/blog/post/lc3-simulator-overview">http://minionhut.com/blog/post/lc3-simulator-overview</a>	

## Education

2014– Dec. 2016	<b>M.S. Computer Engineering</b>	The University of Texas at Austin
	Advisor: Mohit Tiwari Context-aware sensing, Dynamic malware analysis, Machine Learning. GPA: 3.8	
2011–2014	<b>Bachelor of Science</b> , 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	<b>Advanced High School Diploma</b>	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	<b>Dell Innovation Award: Hack TX</b>	Austin TX
	Distinguishing style and content in images: The ability to create any Instagram filter.	
2015	<b>2nd Place MDP Hackathon</b>	Athena Health, Austin TX
	Accurate fall prediction and motion state regression using cellphone accelerometer information.	
2014-2017	<b>Departmental Fellowship</b>	Computer Architecture and Embedded Processing, The University of Texas
2014	<b>Summa Cum Laude</b>	Texas A& M University, Electrical and Computer Engineering
2011-2014	<b>President's Endowed Scholar</b>	Texas A& M University, Electrical and Computer Engineering
2011-2014	<b>Boltzman Scholar</b>	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