

JOSHUA J. BAKITA

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https://jbakita.me/

EDUCATION

- Doctor of Philosophy in Computer Science**, *University of North Carolina at Chapel Hill* Aug. 2019 - Dec. 2022
- Master of Science in Computer Science**, *University of North Carolina at Chapel Hill* Aug. 2018 - May 2019
- Courses of Note: OS Impls, Data Ctr. Sys & Programming, Data Ctr. Software Dynamics, Real-Time Sys, Computer Vision
- Bachelor of Science in Computer Science**, *University of North Carolina at Chapel Hill* Aug. 2014 - May 2018
- **Graduated with Honors** | 3.57 Computer Science Course GPA | Fall 2016 Honors Study Abroad in London
 - Courses of Note: Data Compression, OS, Computer Security, 2D Graphics, Digital Logic & Computer Design

TECHNICAL EXPERIENCE

- Dept. Computer Science - UNC Chapel Hill**, *Research Assistant with Dr. James Anderson* Aug. 2017 - Current
- Led the MC² project, a patch enabling Linux to schedule and isolate mixed-criticality real-time tasks on multicore systems
 - Developed a novel, NUMA-based **O(1) page coloring** technique in Linux's buddy allocator, improving on O(n) state-of-the-art
 - Rewrote MC² to allow for safe real-time scheduling when using SMT, enabling a **>25% capacity boost** and better stability
 - Constructed formal techniques to provide real-time guarantees for programs using SMT or **CUDA** to address **FAA need**
 - Ported lightweight, distributed, system-wide tracing framework KUTrace to Linux on ARM, using **ARMv7 assembly** and **C**
 - Published **1st author** at OSPERT '18, 2nd at **ECRTS'19**, 3rd in **J. of RTS**, 3rd at **RTAS'19**, and 4th at **ECRTS'18**
- General Motors Research**, *Research & Development Intern*, Remote June 2020 - Aug. 2020
- Developed and evaluated lossless GPU parallelization techniques in **CUDA** and **C++** for autonomous vehicle perception DNNs
 - New approach enables **one device to do the work of two** at comparable latency by reducing ctx. switches in the GPU MMU
- Dept. Computer Science - UNC Chapel Hill**, *Teaching Assistant for Programming Lang. Concepts* Jan. 2019 - May 2019
- Taught **Haskell**, **Rust**, **Julia**, and **Go** to illustrate fundamental programming language concepts
 - Honored with "**Teaching Assistant of the Year**" award by CS undergraduates and faculty. Nominated by >30% of my class
- Microsoft Corporation**, *Software Engineering Intern*, Redmond, WA May 2018 - Aug. 2018
- Worked in **C++** on the Web Platform Team to help build the Edge browser (**>100 million active users**) + Windows app APIs
 - Implemented CSS parser, DOM interface, and **GPU-accelerated rendering** for background-blend-mode and mix-blend-mode (used by .04% and .111% of all web pages per Bing, both are top 55% most used CSS properties)
 - Wrote web platform interoperability tests in **HTML**, **CSS**, and **JavaScript** to benchmark and beat Chrome's implementation
- Microsoft Corporation**, *Software Engineering Intern*, Issaquah, WA May 2017 - Aug. 2017
- Redesigned architecture for lead unsubscribe, **increasing speed 2x** for customer and protecting from **over \$3B** in fines
 - Worked in **C#** and **SQL** on enrichment and privacy management systems processing over **16 million leads** weekly
 - Upgraded, unified, and simplified logging in lead enrichment and privacy sync systems to enable business alerting
- House of Commons of the United Kingdom**, *Parliamentary Intern for James Berry MP*, London Sep. 2016 - Dec. 2016
- Capital One Financial Corporation**, *Software Engineering Intern (TDP)*, McLean, VA June 2016 - Aug. 2016
- Refactored free CreditWise tool (**>11 million active users**) to **speed up deployment 10x**, startup by 2x, and testing by ~2x
 - Full stack development in **Java**, Spring MVC, **CSS**, **HTML**, and **AngularJS** on Apache Tomcat in **AWS EC2**
 - Optimized test workflow, removed all proprietary libraries, and significantly slimmed backend codebase size
- Dept. Computer Science - UNC Chapel Hill**, *Research Assistant with Dr. Henry Fuchs* June 2015 - Dec. 2015
- Led a team to apply wearable accelerometers for motion tracking. Personal contribs. in **C** on Arduino and **Java** on Android
- Wildfire Games**, *Open-Source Game Developer* June 2013 - Aug. 2014
- Led a team to develop an online multiplayer matchmaking lobby and ranking system based on XMPP for 0 A.D. RTS
 - Worked with **C++**, **JavaScript**, and XML client-side, **Python** and **Erlang** server-side

SELECTED PROJECTS AND EXTRACURRICULARS

- MIPS I Processor**: Full, consumable implementation of the MIPS I instruction set using Verilog on the Nexys 4 FPGA
- SafeShare**: A vehicle-sharing platform built on mathematically verifiable trust via the Ethereum blockchain
- **Won Best Use of the Blockchain**, **Best Hack Addressing Inequality** and two other awards at HackDuke 2017
- SGI Keyboard Driver**: A Linux kernel module implementing support for SGI's serial keyboards (partially reverse engineered)
- UNC Energy Dashboard**: A way to monitor and react to energy usage on-campus | **Won Microsoft Challenge** at HackNC '15
- Share Sphero**: Cross-platform, multi-user, shared real-time control of the Sphero robot using Web Sockets and HTML5
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- UNC Renewable Energy Special Projects Committee (RESPEC)**, *Voting Member* Sep. 2014 - May 2019
- Collaborated with a committee of over 15 students to **manage over \$1M** for renewable energy initiatives on campus
- UNC Computer Science Club**, *President* May 2017 - Aug. 2018
- Rancho 3M Christian School and Orphanage**, *Missions Trip Volunteer*, Guadalupe, Mexico 2010,11,13,15,16,19
- Eagle Scout; Boy Scouts of America**, *Troop 94* 2007 - 2014