# Robert "Trey" West

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## Education

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| **University of Virginia** – Charlottesville, VA | August 2020 |
| Master's in Computer Engineering | GPA: 3.97 |
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| **Virginia Commonwealth University** – Richmond, VA | May 2018 |
| Bachelor of Science in Computer Engineering, Minor in Computer Science | GPA: 4.00 |
| Bachelor of Science in Mathematics | GPA: 4.00 |

## Technical Skills

**Languages:** Python, C/C++, Java, HTML, CSS, SQL, VHDL
**Tools/Clouds:** Git/GitHub, AWS, LaTex, Vivado
**Operating Systems:** Linux, Windows

## Experience

**Graduate Research Assistant in HPLP Lab** at University of Virginia            *August 2018 - April 2021*
- Added functionality to HotSpot thermal simulation software (written in C) to support next-generation cooling techniques, including microfluidic cooling and inter-layer microchamber cooling
- Improved HotSpot's differential equations solver runtime by 4.2x
- Maintained HotSpot by responding to user questions and bug reports and by updating documentation
- Streamlined HotSpot's command-line interface (CLI) and configuration files by removing unused and redundant options
- Added version-controlling to HotSpot using git and migrated codebase to GitHub
- Began development of HotOpt microfluidic optimization tool in C++ that used a pruning technique to balance pumping efficiency with cooling effectiveness
- Implemented new heat map visualization tools in Python using matplotlib
- Researched memory with FireSim simulator in AWS
- Published papers in TECHCON 2020 and GOMACTech 2021

**Graduate Teaching Assistant** at University of Virginia            *August 2019 - April 2021*
- Received Outstanding TA award from Computer Science department for creating and leading weekly Discussion Sections that gave students extra time to discuss course material
- Was selected as sole graduate TA for UVA's first offering of Data Structures and Algorithms 2

**Engineering Intern with The Boeing Company**            *May 2017 - August 2017*
- Added data capture feature suite to C++ server and Python client to improve network communication with an FPGA
- Improved test coverage for 2 VHDL models

**Teaching Assistant** at Virginia Commonwealth University            *May 2016 - May 2018*
- Assisted in Signals and Systems, Microcomputer Systems, and Digital Systems courses
- Wrote 2 chapters and copyedited 6 chapters of lecture notes in LaTex

## Projects

**University Transportation Service Routing Software (Python) - Graduate Algorithms, Fall 2019**
- Created software to find and display fastest route in real time between locations on UVA's grounds using the bus system
- Interfaced to RESTful APIs: TransLoc, UVA Buildings, Google Distance Matrix, Google Static Maps, Google Directions

**Machine Learning Malware Detection (Python) - Graduate Operating Systems, Fall 2019**
- Developed Decision Tree model in Python to detect malware from sequences of API calls
- I achieved a training time about 1800x faster than published models in exchange for a 6% reduction in F1-Score

**Meggy Java Compiler (Java) - Graduate Compilers, Spring 2019**
- Created compiler for the Meggy Java language, a subset of Java, that compiled a Meggy Java program into AVR assembly
- Used JLex for lexical analysis, JCup for syntax analysis, then implemented semantic analysis and code generation by hand

**Multithreaded RTOS (C) - Advanced Embedded Systems, Fall 2018**
- Developed multithreaded Real-Time Operating System (RTOS) for TM4C123G microcontroller
- Implemented blocking semaphores and fixed- and dynamic-priority scheduling for RTOS
- Co-created two games to run on microcontroller using RTOS: one in which the player attempts to target moving cubes with crosshairs and one multiplayer Connect Four game

**Rapid Photonic Innovation Devices (C, Python) - Senior Design Project, Fall 2017 - Spring 2018**
- Co-developed laser lithography prototyping device to make prototyping cheaper and easier
- Reverse engineered Blu-ray drive to create a "hacked" laser lithography system
- Developed control circuitry and control software in C for interfacing with Blu-ray drive components, such as stepper motors, Brushless DC motor, voice coil actuators, and laser diode
- Created GUI in Python to communicate with Blu-ray drive over USB
- Received the Mark A. Sternheimer Senior Design Award

**FPGA Waveform Generator (C, VHDL) - Advanced Digital Systems Design, Spring 2018**
- Installed Arch Linux on FPGA soft core which interfaced with Digital-to-Analog Converter (DAC) to play music over speaker
- Designed system to generate sine waves, square waves, and sawtooth waves at user-specified amplitudes and frequencies
- Created Zynq Processing system and SPI-controller using VHDL and Vivado together with a Zynq Zybo FPGA
- Wrote control software in C to run on Arch Linux and interface with the SPI-controller, which sent commands to the Digital-to-Analog Converter

**Research Papers - Rhetoric and Math Capstone, Spring 2015 and Fall 2017**
- Researched the way in which students learn about and process numbers and argued that children should be taught the duodecimal (base 12) numbering system
- Researched the mathematical and computational methods used to find God's Number, the minimum number of turns required to solve any Rubik's Cube position

**Operating System Simulation (C++) - Operating Systems, Spring 2017**
- Created simulation of operating system showing processes moving through Five-State Process Model
- Designed and implemented high-level scheduler, dispatcher, and Process Control Blocks using C++

**Puzzle App *Pregel* (Java) - Software Engineering, Fall 2016**
- Co-developed Android puzzle app *Pregel* in Java, which asked users to find Hamiltonian paths through graphs
- Created user interface, scoring system, and statistics display

**Competition Robot (C) - Microcomputer Systems, Fall 2016**
- Co-designed and built robot to compete in line following and maze navigation competitions
- Implemented line following using four reflectance sensors mounted to the bottom of the robot, along with auto-calibration to account for varying ambient light conditions
- Implemented maze navigation using two IR distance sensors and a left-hand wall-following strategy.

**FPGA Voltmeter (VHDL) - Digital Systems, Fall 2016**
- Co-designed and implemented a voltmeter using an FPGA that communicated with an Analog-to-Digital Converter (ADC) via $I^2C$ and displayed voltage measurements on seven-segment display

**Tesla Coil - High School Independent Study, Spring 2014**
- Designed and constructed 12kV Tesla Coil as Independent Research Project
- Implemented two circuits connected through mutual inductance
- Built Terry Filter to protect any connected electrical systems