Jacob A. Bills

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EDUCATION

University of Utah (Combined BS/MS Program) Salt Lake City, Utah, USA
Masters of Computer Science; **GPA: 3.9** *Aug 2022 – May 2024 (Expected)*
Bachelors of Computer Engineering; **GPA: 3.8** *Aug 2017 – May 2024 (Expected)*

SELECT COURSEWORK

Graduate Coursework: Advanced Computer Networks, Graduate Algorithms, Digital VLSI Design, Operating Systems, Software and System Security, Security Operations

Undergraduate Coursework: Algorithms, Web Browser Internals, Fundamentals of Electromagnetics and Transmissions Lines, Embedded System Design, Computer Security, Computer Networks, Digital System Design

SKILLS

Programming: Python, C/C++, Verilog HDL, VHDL, MATLAB, Java, C#

Technologies: Linux, Linux Administration, Git, LaTeX, Quartus, ModelSim, Wireshark, GNU Radio, EAGLE, GDB, Bash, Docker, Quagga, CI/CD deployment, Windows

EXPERIENCE

University of Utah Flux Research Group Salt Lake City, Utah, USA
Graduate Research Assistant *Aug 2022 – Present*
- Studied spectrum occupancy between 2.7GHz and 2.9GHz along with details of weather radar operations
- Developed automated radio sample collection system using cronjobs, bash scripts, and SDRs in the POWDER platform
- Engineered high-performance C code to process files containing raw IQ samples on the order of terabytes
- Created workflow to visualize and analyze collected radio IQ samples in Python looking for spectrum-sharing opportunities
- Pattern matched known data from National Weather Service radar logs to processed IQ data using Python
- Developed logging system to diagnose network issues with remote SDRs operating over multi-gigabit links
- Deployed custom data back-haul protocol to provide up-to-date spectrum occupancy data to central occupancy management system

University of Utah Flux Research Group Salt Lake City, Utah, USA
Undergraduate Research Assistant *May 2020 – Aug 2022*
- Explored wireless signal parameters in a controlled RF matrix on the PhantomNet testbed
- Instantiated end-to-end LTE network using SDRs and COTS UE on the POWDER wireless testbed
- Evaluated performance impacts of adjacent-channel interference WiFi on established DSRC/802.11p connection
- Debugged beta software for next generation C-V2X equipment with vendor engineering team
- Ensured repeatability in measurements by developing GNU Radio based SDR Calibration procedure

PUBLICATIONS

J. A. Bills, A. Orange and J. Van der Merwe, "Adjacent Channel WiFi 5 Interference on DSRC Communication at 5.9GHz," 2023 IEEE 97th Vehicular Technology Conference (VTC2023-Spring), Florence, Italy, 2023

PROJECTS

Wirelessly Controlled Rover | *C, C++, Python*
- Developed python-based control server to issue commands over a network using custom communication schema
- Built receiving network stack on ESP32 using C++ to forward commands to the rover controller over UART
- Developed custom embedded software system to define rover behavior
- Constructed a rover controlled by a Cortex-M0 based arm micro-controller running C
- Utilized sensors and hardware interrupts to collect and react to real-world conditions