

# Jacob A. Bills

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## EDUCATION

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**University of Utah** (Combined BS/MS Program)

*Masters of Computer Science; GPA: 3.889*

*Bachelors of Computer Engineering; GPA: 3.811*

Salt Lake City, Utah, USA

*Aug 2022 – May 2024 (Expected)*

*Aug 2017 – May 2024 (Expected)*

## SELECT COURSEWORK

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**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

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

**Technologies:** Linux, Git, LaTeX, Quartus, ModelSim, Wireshark, GNU Radio, EAGLE, GDB, Bash, Docker, Quagga

## EXPERIENCE

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**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 corn jobs, 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 looking for spectrum-sharing opportunities

**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

## PUBLICATIONS

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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

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**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
- 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

**Containerized Software Defined Network** | Python, Docker, Quagga

- Instantiated a virtual network containing clients and routers with docker compose
- Pre-configured Quagga routing stack defining preferred paths between hosts via docker compose
- Configured OSPF link weights to determine default paths and make the network fault tolerant to sudden removal of routers
- Developed python-based software controller to edit path weights and re-route traffic dynamically