John Dale

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EDUCATION

University of Massachusetts, Amherst **Amherst, MA**
Bachelor of Science in Computer Engineering | GPA: 3.72 **Sep 2020 - Dec 2024**

RELEVANT SKILLS

Programming: Python, C++, C, Bash, SQL, MATLAB **Electrical:** KiCad, Soldering, Batteries, Electronic test equipment
Technologies: Linux, ROS2, Selenium, Flask, Mosquitto **Industry Tools:** Git, Bitbucket, Jira, Confluence

EXPERIENCE

MITRE **McLean, VA**
Computer Engineering Intern **May 2023 – Aug 2023**

- Provided technical assistance in the deployment and evaluation of multiple standalone 5G network configurations
- Developed network load testing software for accessing uplink and downlink throughput during high device density scenarios; specifically utilized network namespaces for resource isolation to simulate 25 high traffic LANs
- Researched and implemented an open source 5G core solution for an indoor 5G femtocell
- Analyzed network performance metrics for configuring optimal RAN and core settings for different sponsor use cases

iRobot **Bedford, MA**
Systems Test Engineer Intern **Jan 2023 – May 2023**

- Supported the development, integration, and optimization of testing fixtures and methods; worked alongside engineers, developers, and product managers to meet fixture requirements for performance evaluations and marketing claims
- Utilized Qualisys, an infrared motion capture system, to reconstitute semi-annual key performance indicator tests of advanced Robot vacuum algorithms, improving test accuracy and time expenditure
- Programmed scripts in Python for automating the analysis of positional data collected in Qualisys for wall follow and obstacle avoidance algorithms, utilized in every iRobot autonomous vacuum
- Developed an API for exposing functionality of a motor controller communicating via a TCP socket
- Documented a Qualisys guide for internal use, providing required steps for calibration, test setup, and execution

National Science Foundation **Amherst, MA**
REU Drone Systems Research **May 2022 – Aug 2022**

- Engineered package delivery features for commercially available drones through hardware and software augmentation
- Developed embedded and server-side software in C++ and Python respectively for package delivery and testament
- Leveraged a REST API for sending package images from the drone to package recipients through SMS text messages

INDIVIDUAL PROJECTS

Blockchain Authorized Camera & Cloud Storage System, *Ongoing Senior Design Project* **July 2023 –Present**

- Digital camera design for protecting the integrity of photos and their metadata, including time and GPS position
- Utilizes encryption methods, TLS, blockchain, SQL, and Amazon S3 buckets in an end-to-end camera system

Hacking Radio-Frequency Identification Protocol, *HackUMass 1st Place Award* **Nov 2022**

- Reverse-engineered Wiegand protocol using bit-banging to perform malicous attacks on RFID access control systems
- Replicated a standard access control system using microcontrollers with software written in C++
- Created and presented an inexpensive, injectable, sniffing device capable of remote replay and DOS attacks
- Integrated a GUI to visualize live data coming across the interface and explain how the attacks work to professors

Electric Vehicle Design & Fabrication, *3-Seat Electric Couch* **June 2022 – Aug 2022**

- Researched, designed, and built electrical sub-systems for a wireless PS4 controlled multi-passenger vehicle
- Programmed electric steering and braking, dynamic throttle control, reverse, lights, and horn functionality in C++
- Utilized digital potentiometers, LL duplex shifters, MOSFET's, DC-DC buck converters, and 18650 battery cells

EXTRACURRICULAR ACTIVITIES & AWARDS

IEEE-HKN National Honor Society – *President* **Spring 2022 – Current**

- Lead and oversee club initiatives that bolster the ECE department and support current undergraduate students

Department of Homeland Security Suitability **Summer 2023**
Grand Prize Hack – *HackUMass 36-Hour Hackathon* - *500 participants* **Fall 2022**
Best Venture Pitch Award – *UMass Center of Entrepreneurship* **Fall 2022**
UMass Amherst Dean's List **Fall 2019 – Fall 2023**

RFID ----------
---------- NEW ----------

- Reverse-engineered Wiegand protocol to perform malicous attacks on RFID access control systems
- Created and presented an inexpensive, injectable, sniffing device capable of remote replay and DOS attacks
- Integrated a GUI to visualize data coming across the interface and demonstrate how the attacks work

---------- OLD ----------

- Replicated standard access control system with ESP8266's programmed in C++ interfacing an SQL database
- Created an inexpensive injectable malicious device that sniffs and stores data across Wiegand data lines
- Created a GUI used to perform attacks remotely
- Integrated 2-factor authentication with a fingerprint biometric over the Cloud to prevent replay attacks

COUCH ----------
---------- NEW ----------

- Researched, designed, and built electrical sub-systems for a wireless PS4 controlled multi-passenger vehicle
- Programmed electric steering and braking, dynamic throttle control, reverse, lights, and horn functionality in C++
- Utilized digital potentiometers, LL duplex shifters, MOSFET's, DC-DC buck converters, and 18650 battery cells
- ---------- OLD ----------
- Researched and designed an electric vehicle system around constrained speed and travel specifications
- Incorporated Bluetooth electric steering and braking, dynamic throttle, lights, and horn using C++
- Utilized digital potentiometers, LL duplex shifters, MOSFET's, DC-DC buck converters, and 18650 battery cells
- Constructed a robust 72V 40Ah battery using 18650 cells and distributed power using DC-DC buck converters

LOCALIZATION ----------
---------- NEW ----------
---------- OLD ----------

- Designed a BLE network of microcontrollers communicating over MQTT for localization of custom advertising beacon
- Developed 3D position estimation using C++, and OpenGL vector graphics for accurate triangulation and visualization
- Translated and compiled C++ OpenGL code into Javascript for seamless integration to a custom dynamic website

RESEARCH ----------
---------- NEW ----------

- Engineered package delivery capability on commercially available drones through hardware and software augmentation
- Developed embedded software and video processing software in C++ and Python respectively
- Leveraged a REST API for sending package images from the drone to package recipients through text messages

---------- OLD ----------

- Conducted research on applications for drone-related systems combining hardware and software components

TODO: ----------

- Make headings with Icons (linkedin, github, email, phone, website)
- Redo bullets with double lines / keywords and make it understandable

Spearhead and oversee club operations, orchestrating impactful meetings and initiatives that bolster the Electrical and Computer Engineering (ECE) department while providing valuable resources for undergraduate students.

Realtime Indoor Localization for Deaf Dogs **Jan 2023 – Aug 2023**

- Designed a network of BLE microcontrollers communicating over MQTT for localization of custom advertising beacon
- Developed 3D position estimation using C++, and OpenGL vector graphics for accurate triangulation and visualization
- Translated and compiled C++ OpenGL code into JavaScript for seamless integration to a custom dynamic website

Jira, Confluence

Programming: C, C++, C#, SQL, R, Perl, Python, MATLAB, JavaScript, OCaml
Operating Systems: Windows, MAC OS, and Linux.
Web Design: Designed www.abc.com, www.xyz.com

Selenium, Flask**,**

Part 107 Commercial Drone License **Summer 2023**