

Colby L. Sawyer

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Objective:

A diligent professional and published academic, who has become proficient in time management, team communication, customer experience and change management. Experienced in technical writing and maintaining software from inception to realization. I possess an ability to quickly adapt to situations requiring high degrees of accuracy and competing demands. I am an effective problem solver and researcher who can drive and manage the execution of complex research projects and who can independently develop solutions to research problems. I apply my experience in software development and project management to complex projects where I contribute innovative ideas backed by in-depth research. I am passionate about learning, research, and mentoring others in applied research.

Work Experience:

Software Developer

August 2021 – Current

East Carolina University – Greenville, NC

BRIDGES (Binding Research Infrastructures for the Deployment of Global Experimental Science)

- Improved and expanded Generic Virtualization Software (GVS) consisting primarily of Python and Java to dynamically configure virtualized resources across international network hardware.
- Implemented a full scale open-source infrastructure resource modeling (IRM) application, Netbox, to manage a multi-node international networking infrastructure.
- Implemented redundancy procedures for IRM by establishing a local and cloud backup (Google Cloud) as well as full restoration capabilities.
- Contributed to and implemented an open-source SaaS OpenNSA which provides virtual circuit management via an NSI protocol driven API. This includes the development of a containerized version of the service (Docker).
- Implemented Meican an open-source web application intended to facilitate the management of virtual circuits in NSI driven APIs through a modern GUI. This was facilitated by a virtualized container stack (Docker).
- Contributed to IP addressing and overall network structure planning for a multi-campus, multi-node international network. This includes the configuration of various Dell servers (Linux) and Juniper/Cisco routers and switches.
- Supervised an undergraduate research assistant to facilitate the implementation of a GVS development environment hosted within a Network Operations Center (NOC) on East Carolina University campus.

NSF Funded Project in collaboration with George Mason University

Locations: Greenville, NC; Ashburn VA; New York City, NY; Amsterdam, NL; Paris, FR

ESDN (Environmental Sensing Data Network)

- Assembled a Raspberry Pi node device with a LoRa transmitting radio capable of receiving multiple serial inputs with sensing data. This “shim” provides compute power at a nodal level for various machine learning, data analysis and encoding for transmission.
- Implemented a software library (Python) capable of communicating to various specific sensor devices. This allows the software components to understand the type of data that will be processed.
- Developed and maintained software capable of communication over generic serial interfaces to facilitate the measurement, encoding and transmission of sensing data. (Python) Wireless communication was transmitted via LoRa to provide cost-effective and low power operation. Machine learning was also developed for the devices to perform a summarization algorithm for the various sensing data. (Python)
- Engineered an infrastructure capable of collecting and aggregating multiple sensing device inputs into an application providing real-time data analysis via graphical representations. Initially deployed using Telegraf agents (Golang) to act as a serial bus transmitting data into an InfluxDB instance (Flux). This model was eventually ported over to the Azure cloud using IoT hub and various cloud functions.
- Planned customer acquisition and enrollment to further utilize automation tooling to ease impact on small working team.
- Presented the infrastructure and end node via formal video presentation and multiple written academic publications.
- Operated the deployment of multiple LoRa gateways to provide a wide radius for infrastructure deployment (East Carolina University Main and Health Sciences campuses).

Software Engineer - Intern

November 2020 – February 2021

Maverick Solutions – Wake Forest, NC

- Developed and modified customer-facing web applications for an Oracle learning platform.
- Worked constantly within entire business organization and team to develop new innovative solutions.
- Documented and heavily tested existing and new portions of the codebase (Javascript).
- Implemented new multiple file selection features to support customer uploads of large amounts of image files to the platform. This required writing to a Google Firestore Real-Time Database the images after they had been properly size constrained.
- Removed various bugs during image file display (proper screen sizing) and in some cases during an image replacement action.

Freelance Software Developer

January 2020 – Current

Greenville, NC

- Created and sold a customer-facing form iOS application that used customer entered data to alert, based on customers inputted location, the correct agent to complete the transaction. An SQLite Database held all contact information for agents. Customers were able to directly send agents emails or SMS messages to begin interaction.
- Mobile application was well documented and debugged (including testing documentation) for further development.
- Created various public websites showcasing basic information (prices, contacts, location) for local small businesses.

Technologies: Swift, Firebase (Authentication and Firestore Database), GitHub Pages (Hosting), Google Domains, SQLite

Academic Research – Multidisciplinary (ITCS/CS)

August 2019 – August 2021

Dr. Ciprian Popoviciu - East Carolina University - Greenville, NC

General/ Pi-Pirates Lab Group:

- Designed, with several other researchers, a collection of small computing modules mounted to Cisco Webex boards deployed in education institutions in Eastern North Carolina and paid for by a grant from the Department of Agriculture; These modules monitor network connectivity issues; in the hopes of preventing/mitigating downtime for IT lacking areas.
- Designed, implemented, and managed website for the display of team's activities to the public and other web-based interfaces to provide a login portal and dashboard displaying machine learning data. The dashboard was facilitated mostly by a Google Firestore Real-Time Database and the authentication feature of the portal was handled by Google Firebase's Authentication API. Hosted with GitHub Pages (see link below).
- Handled set-up of various physical and virtual labs. (Physical network devices, Raspberry Pi units, Docker images, OpenStack, OpenNSA, CentOS, Phoronix Test Suite).
- Contributed to academic publications using various written and graphical data.

<https://pi-pirates-ecu.github.io/PI-Pirates-Site/>

BRIDGES Group:

- Designed, implemented, and managed website for the display of team's activities to the public and other web-based interfaces to provide a login portal and dashboard for file management and future expansion. The dashboard was facilitated mostly by a Google Firestore Real-Time Database and the authentication feature of the portal was handled by Google Firebase's Authentication API. Hosted with GitHub Pages (see link below)
- Contributed to set-up of physical testing lab at East Carolina University. Including a server running OpenNSA and Openstack, along with other devices to support/test a GVS environment.

<https://bridges-testbed.com/>

Application Support & Development Internship

Summer 2020

8 Week Program, – First Citizens Bank – Raleigh, NC

- Created a new database search tool, with user interface, facilitating the collection and organization of various business unit Server-to-Application connections. (MS Access, SQLite)
- Documented creation process and change management plans for newly created tool.
- Provided support for various customer support issues

Publications:

Sawyer, C. L., Popoviciu, C. 2022 *Enabling Generic Sensing Devices to use LoRa Communication 2022* ASEE Annual Conference. (In Press)

Sawyer, C. L., Popoviciu, C. 2022 *Building the Campus-as-a-Lab Platform 2022* ASEE Annual Conference. (In Press)

Popoviciu, C., & Lunsford, P. J., & Pickard, J., & **Sawyer, C. L.,** & Woodburn, J., & Zynda, Z. R., & Drummond, D. (2020, June), *Deploying a Network Management Overlay for Education Video Conferencing Services*. Paper presented at 2020 ASEE Virtual Annual Conference Content Access, Virtual On line . 10.18260/1-2--34381. Available: <https://www.asee.org/public/conferences/172/papers/29604/view>

Popoviciu, C., & Lunsford, P. J., & Pickard, J., & **Sawyer, C. L.,** & Drummond, D., & Zynda, Z. R., & Lee, S., & Wear, S. (2020, June), *A Multidisciplinary Project: Deploying Edge Computing to Augment Endpoint Functionality* Paper presented at 2020 ASEE Virtual Annual Conference Content Access, Virtual On line . 10.18260/1-2--34021 Available: <https://www.asee.org/public/conferences/172/papers/29638/view>

Skills:

- **Various SaaS:** (Phoronix Test Suite, Citrix Workspace, VMware, OpenNSA, Meican)
- **Programming Languages:** (Python, Java, Golang, Flux, C+, CSS, HTML5, SAS, JavaScript, Kotlin, Swift, Prolog, Haskell)
- **Cloud-based Workflows:** (GitHub, Jira, Git, Kanban, Trello)
- **Application Tool/API Integrations:** (Google Firebase, Google Cloud Platform)
- **Workflow Management Frameworks:** (AGILE/Scrum)
- **Database Creation and Management:** (SQL, SQLite, MS Access, Google Firestore)
- **IoT/Virtualization/Containers:** (Balena, Docker, Kubernetes)
- **Operating Systems:** (Windows, Mac, Linux, Raspbian, BalenaOS, RHEL)
- **IaaS experience:** (Google Cloud Compute Engine & Persistent Disk, OpenStack)
- **Network Management:** (Physical/Virtual Devices (Switches, Routers, Servers))

Education:

Bachelor of Science - Computer Science
w/Minor - General Business Administration
East Carolina University Greenville, NC
2021