Robin Simpson

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Education

California Polytechnic State University **Dec 2025**
Bachelor of Science in Computer Engineering w/ Minor in Astrophysics *San Luis Obispo, CA*

Skills

Programming Languages: Python, Java, C, C++, JavaScript, SQL, Bash, Assembly, SystemVerilog
Developer Tools: Git, CI/CD, Docker, Ansible, Slurm, Vim, VSCode, IDEs, Libvirt, Podman, AWS
Frameworks/Libraries: Flask, React, Plotly, Dash, Pandas, Scikit-learn, FPGA, Arduino, STM32
Technologies/Methodologies: Linux, RESTful APIs, Test-Driven Development, Agile, Databases

Work Experience

National Renewable Energy Laboratory **September 2024 - Present**
Software Developer Intern

- Developed and maintained open-source software using **Python** and **Dash Plotly** for NREL's OpenPATH, a platform that tracks travel modes and measures energy use and carbon footprint.
- Optimized **backend** performance by reducing query times by up to **10x** through the elimination of unnecessary computations and streamlining processing, enhancing system scalability and reliability.
- Implemented new **front-end** features and revamped existing codebase, improving user experience and interface functionality by designing and deploying new pages.

Los Alamos National Laboratory **May 2024 - August 2024**
High Performance Computing Intern

- Assembled and configured a 10-node **HPC Linux** cluster with **Ansible**, utilizing technologies such as **Libvirt** for network management, **AWS S3** for object storage, **Cloud-Init** for post-boot configurations.
- Optimized HPC network performance by deploying **containerized services** on Arista and Mellanox switches via **Docker** and **Podman**, offloading key tasks such as monitoring, data caching, and IP management, resulting in improved efficiency and reduced server load.
- Integrated **MPI** and **SLURM** for efficient job scheduling and resource allocation, while utilizing **Telegraf** and **Grafana** for real-time performance monitoring and visualization, enhancing the cluster's operational efficiency and scalability.

NASA **January 2024 - May 2024**
Data Analytics Intern

- Developed a search engine utilizing **Elasticsearch and FastAPI** for technical documents.
- Enhanced financial and performance metrics for NASA facilities by leveraging **Python** to refine analytics in cost tracking and operational performance.
- Prototyped and integrated planning tools using **Ag-Grid and Dash framework**.

Lawrence Livermore National Laboratory **May 2023 - August 2023**
Software Engineer Intern

- Developed an app with **FastAPI, Angular, and Docker** for managing data, archiving and search features.
- Designed and implemented **RESTful** endpoints, **unit**, and **integration testing** on backend services.
- Participated in **Agile** methodologies, engaging in **Scrum** and **Sprint**, and review for development processes.

Argonne National Laboratory **May 2022 - August 2022**
Computing Intern

- Developed a web application to geolocate and visualize critical infrastructure sites via scraping.
- Utilized **Dash, Plotly, and Python** for creating graphical 3D arc and heat map visualizations.
- Integrated Unity 3D simulations to demonstrate the impacts of infrastructure failures on web dashboard.

Collaborative Experience

Cisco x Cal Poly **September 2024 - March 2025**

Machine Learning Developer/Analytics

- Developed a web-based anomaly detection system for manufacturing test data using **autoencoders**, optimizing model performance with **Bayesian optimization** and the **Streamlit framework**.
- Deployed the system using **Amazon EC2**, **Route 53**, and **Lambda** for scalability and high availability.
- Created a user-friendly dashboard that enables non-data scientists to run models, input parameters, and visualize results for various product datasets.

San Luis Obispo Climate Coalition x Cal Poly **August 2023 - May 2024**

Web and App Development

- Developed BinMaps, a web app for aggregating trash, recycle, and compost bins on a user-editable map using **Mapbox, JavaScript, Node.js, and Firebase.**
- Designed an intuitive interface with bin details, supporting real-time updates and dynamic user interactions.
- Enabled placement of bins in various locations (e.g., schools, downtown) to promote community participation.

Posters, Presentations, and Publications

- **Robin Simpson**, Anvitha Ramachandran, Dohyun Lee, "Containerization on Switches", *Supercomputing 2024*, (November 2024, Atlanta, GA).
- **Robin Simpson**, Dr. Pei Zhang, Dr. Ninqiao Li, "Integrating Robots in Hospitality: Opportunities Through Image Analysis", *NCUR* , (April 2024, Long Beach, CA).
- Contributions to "RUI: Harnessing Rubin Observatory Data to Prepare Tomorrow's STEM Leaders: Galaxy Evolution and Large Scale Structure", *NSF Project Award Number: 2205976*, (Louise Edwards, PI, Cal Poly, September 2023 - April 2024).
- **Robin Simpson**, "OneLaunch Threat Response", *DOE Conference*, (August 2023, Washington, DC).
- Yash Raj Singh, Jeffrey Yum, **Robin Simpson**, "Darc: Empowering LEP/MOD Test Data with Efficient Archive and Search", *Summer Slam*, (August 2023, Livermore, CA).

Projects

Pipelined RISC-V CPU on Basys3

- Designed and implemented a 5-stage pipelined **RISC-V MCU** using **SystemVerilog** on a **FPGA** board, including components like the Program Counter, ALU, and Control Unit.
- Utilized **Vivado** for functional and timing simulation to ensure system stability and accuracy.

Frequency Actuated Lock

- Implemented a **signal processing** chain comprising a microphone (CMA-4544PF), amplifier, and comparator to convert ambient sounds into clean square waves, accurately representing the desired frequencies.
- Programmed an **Arduino Uno R3** to analyze the processed signals and control a solenoid lock via a **MOSFET** actuator (AOI4286), ensuring the lock actuates only when the correct frequency is detected.

SQL Remake

- Developed a **SQL** remake using **C++**, implementing data structures and algorithms to manage operations.
- Created a command-line interface and batch processing, allowing users to execute SQL commands.
- Simulated a database as a local file system using text files, handling file I/O operations for data.