Jonathan Kelley

jkelleyrtp@gmail.com
github.com/jkelleyrtp

EDUCATION

Olin College of Engineering | Boston, MA — **August 2018 - May 2022**

Software Systems Engineering (EECS) and Entrepreneurship

EXPERIENCE

LEAF Systems - *Co-founder* — **March 2021 - Present**, *Boston, MA*

Cofounder for early stage angel-backed startup modernizing inventory management for manufacturing.

- Finalist for MIT's Lemelson Student Prize, 100K Pitch, 100K Accelerate, and Fuse competitions
- Building out asset tracking system leveraging computer vision, deep learnng, and ultrawideband sensor fusion.

HASH AI - *Fullstack Platform Engineer* — **Aug 2019 - Jan 2021**, *NYC, Remote*

Fulltime role building next-gen Agent-Based-Modeling Engine and IDE for business intelligence.

Core Engine

- Architected and implemented distributed simulation engine written in Rust and deployed to AWS EKS (20K+ LoC).
- Developed mutlithreaded low-latency columnar datastore for simulation data on top of Apache Arrow.
- Architected and implemented hyper-parameter optimization engine in Rust utilizing Reinforcement Learning / Deep NN.
- Upstreamed improvements to various open source projects including Pyodide, Apache Arrow, and PyO3.
- Interviewed, hired, and managed the "Cloud" and "Engine" teams across 5 timezones to launch the company's first product.

Backend

- Built, monitored, and maintained various backend webservices written in Rust, TypeScript, and Go including the company's GraphQL endpoint, WebSocket broker, and Simulation Data Storage API.
- Maintained the company's CI and deployment pipeline with CircleCI, Terraform, Vault, Kubernetes, Cloudflare, and AWS.

Frontend

- Built the 3D simulation viewer for the Cloud IDE product using Three.JS, RecoilJS, and custom GLSL shaders.
- Built various major frontend components for the Cloud-based IDE with React, Redux, ThreeJS, React-Three-Fiber.

Quartz Inc - *Systems Engineering Intern* — **April 2019 - Aug 2019**, San Francisco, CA

Summer internship role building next-gen intelligence system for large construction jobs.

- Designed and deployed industrial-grade camera and sensor hardware for live tower cranes in San Francisco.
- Developed real-time sensor data capture and photogrammetry software written in Rust deployed on NVidia TX2.
- Improved wireless streaming and visualization performance by over 3x with a suite of custom analytics software.

NASA Langley Research Center - *NASA HUNCH Systems Engineeirng Intern* — **Aug 2016 - Sept 2018**, Durham NC

Year-round internship working alongside NASA Langely engineers to build solutions for problems on the ISS.

- Designed zero-gravity injection molding system for in-space fabrication of mission-critical polymer-based parts.
- Designed and built RFID and UWB wireless asset managemenet system for equipment on the ISS.

Physics Researcher - *Fully-funded research program in Physics and Engineering* — **Sept 2016 - June 2018**, Durham, NC

Self-designed computational and experimental physics research into Inertial Electrostatic nuclear fusion.

- Worked with Duke and TUNL researchers to develop novel intertial plasma Particle-In-Cell simulation engine.
- Publish paper in Broadstreet Scientific on the simulation of magnetic cusp confinement for electrons in nuclear fusion.
- Built experimental electron plasma confinement device, achieving high vacuum and high electric potential.

PROJECTS

WiFi From Scratch - Realtime OFDM Video Broadcast — `https://github.com/jkelleyrtp/OFDM-livestream`

Implemented the WiFi protocol from scratch on the Ettus USRP software-defined-radio.

- Developed a Rust-Verilog-CUDA data pipeline for streaming video with implemented bandwidth of 1MB/s.
- Implemented modern OFDM, MIMO, 64QAM and active frequency correction.

Dioxus frontend framework for Rust — `https://github.com/jkelleyrtp/dioxus`

Built and open-sourced a frontend framework for apps built in Rust, supporting the Web, Desktop, Mobile, and Server.

- World's fastest web framework using a custom memory allocator, stack machines, and Meyers-patience diffing algorithm.

Shadowboxing 8-DOF Humanoid Robot — `https://github.com/jkelleyrtp/realsteel`

Designed and built a humanoid boxing robot that uses computer vision and inverse kinematics to mimic a human player.

- Implemented with state-space controller, PID correction, OpenCV-powered skeletal tracking, and custom electronics.

Markerless Superposition for Augmented Reality on Magic Leap

Developed novel algorithms to track items in video feed using their CAD representation as a training set.

- Built a C++-based application running on the Magic Leap levearging point clouds, ORB descriptors, SLAM, and Deep NN.

SKILLS

Software Rust, TypeScript, Python, Go, C, C++, Lua, Verilog, OpenCL, CUDA, FPGA.
Electrical KiCad, Eagle, Spice, SMD design and assembly, power electronics, embedded firmware.
Hardware SolidWorks, OnShape, HSMWorks CAM, CNC Mill, Lathe, Waterjet, EDM, vacuum design.
Interests Hard Sciences/Math, Automation, Embedded, Manufacturing, Data Engineering, Complex Systems, Hardware