

Patrick Kulach

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Experience

4170 Trading LLC, *Software Engineer, Chicago IL*

June 2022 - April 2024

- Worked in a team of 4 to implement a backend trading system in **C++** to allow users to algorithmically trade securities across multiple exchanges, complete with a risk management system, to prevent large scale losses, while optimizing for reduce latency
- Built a multi-exchange centralized market data system, which allows traders to listen to live updates to different markets, fine-tuned to provide stability, and robustness
- Built a **Python** engine supported with an API to provide traders with a user-friendly interface to allow for access to backend systems, including market data and order placement
- Created a **React**-powered frontend application to manage and track orders, trades, and allotted risk limits for a given strategy, interfaced with the backend trading system
- Built an exchange simulator designed to reflect the exchange's system, to allow system wide testing
- Maintained and increased reliability of back office system that creates and tracks contracts, trades, and financial statements, using databases on **Google Cloud**
- Interfaced with **Grafana** and **Prometheus**, a service to allow for monitoring of different aspects of the system, to track improvements of different functionalities of the system

Aechelon Technology, *Software Engineer Intern, Overland KS*

May 2021 - August 2021

- Worked on PC-Nova, a real-time flight simulator, specifically designed for military applications
- Researched and implemented a surface texturing system, which combines a small sample of textures and rearranges and interpolates them via a pseudo random system, to create an efficient and natural looking close-up terrain, using **C++** and the **ARB** shading language

UIUC Computer Systems Engineering, *Undergrad TA, Urbana IL*

January 2021 - May 2022

- Assisted students in learning computer architecture, operating systems, and building a simple x86 OS in **C**, with functionalities such as program execution, drivers, and system call support

Education

University of Illinois at Urbana-Champaign

The Grainger College of Engineering

B.S. – Computer Engineering

August 2018 - May 2022

Honors, GPA: 3.8

Projects

- **Terminal Music Visualization**: Created a music visualization app running in a **Linux** terminal that interfaces with the PulseAudio API, and is generated with a highly optimized, cache aware, SIMD Fast Fourier Transform Algorithm
- **RISC-V CPU**: Designed a RISC-V CPU in SystemVerilog with compressed and multiplication instructions, capable of running compiled programs, and optimized to reduce clock cycles
- **Financial Utils**: Built a **Rust** utility program to handle common data manipulations

Skills

- **Fluent**: C/C++, Python, Linux, Bash, Typescript/Javascript, Numpy, Networking, System Programming, Debugging Software (gdb, pdb), Google Cloud
- **Familiar**: Rust, Pandas, Boost, SystemVerilog, React, Linear Algebra, Statistics
- **Relevant**: Git, Docker, Github Actions, Prometheus, Profiling Tools

Courses

Distributed Systems - Digital Signal Processing - Computer Networking
Computer Organization and Design - Computer Security - Machine Learning