Russel Arbore

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Education

University of Illinois Urbana-Champaign

BS+MS 2025 (expected), GPA: 4.0/4.0
Computer Science
Grainger Engineering

Los Altos High School, Los Altos, California

Class of 2021, GPA: 4.57/4.0

Coursework (UIUC)

CS 598 - ML for Compilers & Architecture
CS 526 - Advanced Compiler Construction
CS 433 - Computer System Organization
CS 426 - Compiler Construction
CS 421 - Programming Languages & Compilers
CS 374 - Algorithms & Models of Computation
CS 341 - Systems Programming
ECE 512 - Computer Microarchitecture (in progress)
CS 423 - Operating Systems Design (in progress)

Skills Summary

- Rust, C++, C, Haskell, Python, LLVM, Linux, Vulkan, OpenGL, CUDA, PyTorch

Work Experience

LLVM Research Group, UIUC, Illinois

Research Assistant (in-person) for Prof. Vikram Adve | August 2022 - Present

- Creating new compiler targeting heterogenous systems using a novel intermediate representation
- Developing FPGA backend for HPVM compiler infrastructure, using LLVM and OpenCL
- Participating in group's organizational activities

NVIDIA, Santa Clara, California

Deep Learning Compiler Intern (in-person) | May 2023 - August 2023

- Developed new text format for IR of internal deep learning compiler
- Created new fuzzing methodology to automatically find new bugs with zero false positives
- Implemented shape inference code for checking the shapes of tensor values in the IR
- Integrated static analysis tool into compiler to verify safety of GPU code

Aechelon Technology, Overland Park, Kansas

Junior Software Engineer (in-person) | May 2022 - August 2022

- Developed OpenGL application using ray-marching to volumetrically render clouds (<5ms frame-times)
- Integrated cloud rendering algorithm into core rendering engine, using Nvidia GL extensions
- Implemented performance optimizations: precomputed shadows, temporal reprojection, variable rate shading

Lawrence Berkeley National Lab, Berkeley, California

Research Assistant (remote) for Dr. Daniel Feldman | Jan 2022 - May 2022

- Created Python / C++ software for running MODTRAN on HPC systems, using OpenMPI
- Managed HPC workloads on the Cori (NERSC) and Pleiades (NASA) Supercomputers' Linux nodes

Nelumbo, Inc., Hayward, California

Computer Vision and Software Intern (in-person) | May 2021 - August 2021

- Created systems for quantifying the propagation of frost and condensation of droplets on hydrophobic surfaces
- Developed a configurable pipeline for analyzing multiple time series of images from frost & defrost cycles
- Tracked droplet positions within images and droplets entering and leaving surface, using OpenCV

Personal Project Highlights (see all on GitHub)

weakc (Compiler)

- Created a simple programming language with tensor operations, type inference, and control flow
- Implemented a compiler targeting x86-64 machine code in Rust (from scratch, no dependencies)

trace (Renderer)

- Developed a realtime path traced renderer in C++, with Vulkan (using Vulkan's RT API)
- Implemented GGX BRDF, next event estimation, and spatiotemporal variance-guided filtering