






Cade Brown

Software Developer • Mathematician • Digital Artist

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EXPERIENCE

NVIDIA | MACHINE LEARNING COMPILER RESEARCH INTERN
2022 (Summer) | Knoxville, TN, US

- **Improved performance** for training and inference of Machine Learning (ML) models, using AI-driven optimization heuristics.
- **Developed polyhedral compilers** to improve code generation (matmul, conv2d), using geometric interpretations of source code.

Innovative Computing Laboratory | RESEARCH ASSISTANT (HPC)
2019 – Present | Knoxville, TN, US

- **Created a dataset** for ORNL's Data Challenge: cade.site/smcefr
- **Ported and performance-tuned** the MAGMA linear algebra library for new AMD GPU hardware, aimed at the ORNL Frontier HPC system
- **Improved performance** 60x faster for certain BLAS, 73% faster for Eigenvalue problems. **Published @ IEEE HPEC:** cade.site/paper0

PAIRS @ UTK | RESEARCH ASSISTANT (HCI)
2021 - 2022 | Knoxville, TN, US

- **Implemented a research prototype** of Avocat, an automated error solver for the terminal
- **Evaluated and improved** performance of database queries for WorldSyntaxTree, a terabyte-scale graph database of source code

Leadership Computing Facility @ ORNL | RESEARCH INTERN
2017 – 2018 | Oak Ridge, TN, US

- **Used CUDA, MPI, and SDL** to build a realtime distributed fractal rendering application/simulation
- **Programmed the NVIDIA Jetson platform** to divide and distribute the workload between 8 nodes (CPU & GPU) over a local network
- **Used Jekyll, HTML, and GitHub** to build a public website: simplesummit.github.io

PROJECTS

- **kscript, a dynamic programming language** that I wrote from scratch, check it out: term.kscript.org (online REPL)
- **CARVE, an online RISC-V IDE** with an editor, debugger, and memory explorer: carve.chemicaldevelopment.us
- **My digital art** which is often ML/AI-generated: cade.site/art

MY CONTENT

- lwn.net/Articles/833624
- cade.site/archive
- docs.kscript.org

MY CODE

- cade.site/timeline
- github.com/cadebrown
- kscript.org

SKILLS

Software

Languages
C/C++ • C# (Mono) • Python
JavaScript • WebAssembly

Frameworks
CUDA • HIP/ROCm • OpenCL
OpenMP • MPI • pthreads
LLVM • Emscripten • ReactJS

Machine Learning
Tensorflow • PyTorch • TinyML

Graphics
OpenGL • WebGL • WebGPU
Matplotlib • QT+PyQT • Unity3D

Misc
L^AT_EX • Blender3D • Jekyll

EDUCATION

University of Tennessee
B.S. COMPUTER SCIENCE
MINOR: PHILOSOPHY
2019 - 2023* | Knoxville, TN, US