



Cade Brown

Software Developer • Mathematician • Digital Artist

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EXPERIENCE

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

- **Accelerated training and inference** of machine learning models (LLMs, CNNs, etc) with research compiler technologies.
- **Improved GPU kernel code generation** for tensor operations using polyhedral compilation techniques, backend for **MLIR/XLA/PyTorch**.
- **Implemented ML-assisted code optimization** and tuning framework to improve GPU kernel performance using neural networks.

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

- **Developed GPU supercomputing math libraries** for accelerating scientific applications at exascale (Summit/Frontier systems).
- **Optimized MAGMA library** for AMD GPU hardware (73% faster time-to-solution) **Published @ IEEE HPEC: cade.site/paper0**
- **Developed scientific machine learning platform** for reproducibility of scientific surrogate networks using FAIR principles
- **Created an ML dataset** for ORNL's Data Challenge: cade.site/smcefr

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

- **Implemented a research prototype** of Avocat, an automated error solver for the terminal that improves developer efficiency.
- **Developed scalable data-driven source code insights** for WorldSyntaxTree, a terabyte-scale graph database.

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: cade.site/fractalvideo
- **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: simplesummit.github.io

PROJECTS

- **My personal website: cade.site** (my research, digital art, and more).
- **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 CONTENT

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

MY CODE

- cade.site/code
- 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
Firebase • sqlite • ArangoDB

EDUCATION

University of Tennessee

B.S. COMPUTER SCIENCE

MINOR: PHILOSOPHY

2019 - 2023* | Knoxville, TN, US