






# Cade Brown

Software Developer • Mathematician • Digital Artist

 [cade.site/about](http://cade.site/about)  [cadebrown](https://github.com/cadebrown)  [cade-brown](https://www.linkedin.com/company/cade-brown)  [me@cade.site](mailto:me@cade.site)  +1 865-368-8485

## 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 compilation heuristics.
- **Trained ML models** to optimize other ML models' training and inference using performance data.
- **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 an ML dataset** for ORNL's Data Challenge: [cade.site/smcefr](https://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](https://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: [cade.site/fractalvideo](https://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 a website: [simplesummit.github.io](https://simplesummit.github.io)

## PROJECTS

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

## MY CONTENT

- [lwn.net/Articles/833624](https://lwn.net/Articles/833624)
- [cade.site/archive](https://cade.site/archive)
- [docs.kscript.org](https://docs.kscript.org)

## MY CODE

- [cade.site/timeline](https://cade.site/timeline)
- [github.com/cadebrown](https://github.com/cadebrown)
- [kscript.org](https://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<sup>A</sup>T<sub>E</sub>X • Blender3D • Jekyll

## EDUCATION

### University of Tennessee

B.S. COMPUTER SCIENCE  
MINOR: PHILOSOPHY

2019 - 2023\* | Knoxville, TN, US