Jacob Davis

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Education

Clemson University **Clemson, SC**

Bachelor of Science in Computer Science and Mathematical Sciences (GPA: 3.96) *Aug. 23 – May. 27*

- **Honors & Certifications**: Clemson University Honors College, Clemson Dixon Fellows Program, Cadence AI/ML Fundamentals
- **Clubs & Affiliations**: Clemson Cadence Project (Leader), Undergraduate Teaching Assistant, Clemson Symphony Orchestra (Leader)

Experience

NASA Goddard Space Flight Center **Greenbelt, MD**

Software Engineer Intern *Jun. 25 - Aug. 25*

- Implement a sky localization algorithm for compact binary mergers detected by LIGO/Virgo/KAGRA using GPU programming, achieving a **performance increase by a factor of three** compared to C code parallelized on the CPU.
- Migrate performance-critical code in open source software used in production environments at gravitational-wave observatories to parallel processing frameworks, **reducing runtime by 99%** compared to sequential code.
- Skills Used: JAX, CUDA, OpenCL, OpenMP, NumPy, Python, C

Clemson University International Center for Automotive Research **Greenville, SC**

Software Engineering Research Intern *Aug. 24 - May. 25*

- Trained and fine-tuned YOLOv8 and LiDAR segmentation models for object detection using a custom labeled dataset of outdoor environments, achieving **95% accuracy** in differentiating classes of trails and vegetation.
- Collaborated with an industry partner to develop a sensor data collection system for an off-road autonomous vehicle, including thermal, hyperspectral, stereo vision, and time of flight sensors.
- Skills Used: PyTorch, Classification Modeling, ArenaView, ZED SDK, Boson SDK

Cadence Design Systems **San Jose, CA**

Application Engineer Intern *May. 24 - Aug. 24*

- Achieved **99% functional coverage** in a sous vide controller design using Universal Verification Methodology, pinpointing over **20** bugs in the RTL code for a controller design across **30+** features.
- Designed C++ and Python programs to automate generating and running simulations in Cadence tools, increasing workflow efficiency for simulating test cases by **30%**.
- Delivered two technical design reviews in collaboration with a verification team, ensuring alignment with design specifications.
- Skills Used: UVM, SystemVerilog, C++, Linux, Shell Scripting, Cadence Xcelium, Cadence SimVision

Network Systems and Control Group **Clemson, SC**

Machine Learning Research Assistant *Sep. 23 - May. 25*

- Developed neural networks leveraging gradient clipping in distributed training settings on Clemson's Palmetto Cluster, improving image classification accuracy by **15%** compared to conventional training algorithms on heterogeneous data distributions.
- Led 10+ research meetings about learning PyTorch and how to use AWS resources for high-performance computing.
- Skills Used: PyTorch, AWS, ResNet, Git

Projects

High-Performance Cluster Computing | *Spack, Slurm, OpenMPI, Docker* *Jan. 25 - Present*

- Assemble a four-node Raspberry Pi mini-cluster to simulate Clemson's **TOP500** Palmetto Cluster by configuring the environment using Spack to run OpenMPI applications and LINPACK benchmarks (maximum performance of **~14.5 GFLOPs**).
- Train and prepare with a team of six undergraduates to compete in SC25's international Student Cluster Competition (SCC).

Vincent Van Gesture | *JavaScript, Node.js, Godot, WebSocket, HTML* *Feb. 25*

- Produced a tower defense game that tracks gestures detected from the inertial measurement unit and magnetometer of a cellphone to perform abilities that dynamically update the user environment.
- Mapped captured movements to the acceleration domain to use a nearest-neighbor classifier to classify gestures with **95% accuracy**.

Virtual Reality Piano Simulator | *Unity, C#, Blender* *Oct. 23*

- Constructed a 61-key piano simulator in virtual reality, utilizing a collision detection system to play the piano keys upon user input.
- Won the "**Best Game Award**" at CUhackit's HelloWorld 2023 hackathon.

Music Guessing Game | *React, JavaScript, HTML, CSS* *Feb. 24*

- Designed a 50+ song Wordle-style music-guessing game titled "Leaftle," featuring a responsive and interactive frontend UI.
- Won the "**Best .tech Domain Award**" at CUhackit's 2024 hackathon.