

James Minardi

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SKILLS & PROJECTS

OpenGL-Compliant GPU on FPGA

- Designed and developed an **OpenGL-compliant GPU** on an **FPGA** using **VHDL**.
- Implement **rasterization algorithms** to reduce traversal & interpolation time and minimize hardware **resource consumption**.
- Design **vertex** and **fragment shader** cores to execute **GLSL instructions** on the GPU.
- **Render** dynamic **3D scenes** with shaded models in **OpenGL** to test **hardware performance**.
- Compare **results** of several **lighting models**, including Phong and Gourad.

MIPS Pipelined CPU in VHDL

- Designed, developed, and tested a **MIPS Pipelined CPU**, considering **critical paths** and **hazards**.
- Analyzed performance and optimized both HW & SW to perform **~60% faster** than its single-cycle counterpart.

Machine Learning HW Accelerator

- Design and evaluate **ML accelerator** on **FPGA**
- Implement hardware design **optimizations** for **deep learning** including **quantization**, data re-use, etc.
- Design a software DNN and implement SW optimizations like quantization, tiling, and SIMD.

Skills: Computer Graphics, GPU & ML Architecture, RTL Design, VHDL, C++, Embedded Systems, OpenGL, Verilog

WORK EXPERIENCE

Software Engineer - Internship

May 2023 - August 2023 (4 mo.)

Musco Sports Lighting | Des Moines, Iowa

- Design, develop, and test next generation **AI technology** for sports markets with the emerging tech R&D team.
- Create the foundation for an **AI** and **video processing** platform to **reduce development time** and **code reuse** across multiple products.
- Develop bash scripts to automatically perform debugging services on **hundreds** of edge devices in the field.
- Advocate for and implement proper software **development** and **deployment practices** for new and existing projects enabling **faster** development cycles.
- Create active **CI/CD** pipelines for **testing**, **staging**, and **production** environments with git integration.

Embedded Software Engineer - Co-op

June 2022 - April 2023 (11 mo.)

BAE Systems, Inc. | Cedar Rapids, Iowa

- Experience designing, developing, and testing **advanced processing** software for real-time embedded GPS receivers.
- Contribute over **2,500+** lines of production code while balancing **performance**, **memory**, and **power requirements**.
- Implement several **linear algebra** and **combinatorial** algorithms to support new hardware and systems requirements.
- Advocate for better **C/C++ coding practices** to promote efficient code development.
- Experience all phases of the software development life-cycle: *requirements, design, code development, integration, verification, and documentation.*

Resident Assistant & Vice President

July 2021 - Present (2+ yr.)

Iowa State University | Ames, Iowa

- Serve as **Vice President** to represent all RAs on campus for department leadership.
- Foster the development of an **inclusive** community of **70+** ethnically **diverse** residents.
- Compile weekly reports with **clear** and **detailed descriptions** of maintenance and community concerns.
- **Manage several administrative duties:** *budgeting, maintenance requests, and incident reports.*

EDUCATION

Iowa State University, B.S. Computer Engineering

Expected Graduation May 2025

- GPA: **3.73 / 4.0**