Alexander Manley

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EDUCATION

08/2023 – 05/2025 **Master of Science (MS) in Computer Engineering**
University of Kansas
- **Focus:** Computer Architecture, Hardware Systems, ML for System Design
- Advanced Computer Architecture, Modern Computer Organization and Design, Embedded Machine Learning, Program Synthesis

08/2019 – 05/2023 **Bachelor of Science (BS) in Computer Engineering**
University of Kansas
- **Honors:** Dean's List, Research Fellowship, 2x Research Award, Distinction Scholarship
- Digital Logic Design, Embedded Systems, Digital Systems Design, Computer Architecture, Operating Systems

SKILLS

Languages
Python, C++, C, VHDL, Scala, Assembly, SystemVerilog

Machine Learning Tools
pytorch, tensorflow, transformers, langchain

Software
Cadence Genus, Cadence Innovus, RedHat OpenShift AI, Xilinx Vitis HLS, Xilinx Vivado, KiCAD, gem5, firesim, QEMU

PROFESSIONAL EXPERIENCE

08/2023 – Present **Graduate Research Assistant**
University of Kansas
- Utilized novel large language models and reinforcement learning for generative AI solutions to design space exploration.
- Developed a modern educational training platform to teach computer architecture integrated with gem5 simulation.
- Optimized custom IP to regulate memory accesses to shared LLC; providing defense against denial-of-service cache bank contention attacks in real-time systems.

08/2023 – Present **Graduate Teaching Assistant**
University of Kansas
- Mentored students to achieve successful projects, ensuring a safe environment and productive student collaboration.
- Provided flexible, adaptive advice based on the unique needs and goals of each team.
- Nurtured a collaborative environment, fostering critical analysis and solution-oriented teamwork.

11/2020 – 05/2023 **Undergraduate Research Fellow**
University of Kansas
- Applied processing-in-memory (PIM) techniques and alternative write queue models to mitigate the memory bottleneck of high-performance servers.
- Developed FPGA-accelerated FireSim simulation to discover hardware-level bottlenecks of gem5.
- Cross-compiled PARSEC benchmarks for the ARM ISA to run on gem5 full system environment.

PROFESSIONAL COURSES

gem5 bootcamp
UC Davis
July 2024

RAG Agents with LLMs
NVIDIA
October 2024

Hands-On RTL Design
QuickSilicon
December 2024

PUBLICATIONS

2024 **Per-Bank Bandwidth Regulation of Shared Last-Level Cache for Real-Time Systems**
IEEE Real-Time Systems Symposium

2023 **Profiling gem5 Simulator**
IEEE International Symposium on Performance Analysis of Systems and Software

2022 **Profiling an Architectural Simulator**
IEEE International Symposium on Performance Analysis of Systems and Software

PROJECTS

2024 **PixelForge**
Cloud Infrastructure
- Developed a cutting-edge prototype for on-the-go image editing, powered by AI/ML models to enhance user experience
- Utilized OpenShiftAI to retrieve image data from Dropbox using access tokens, ensuring secure and efficient data transfer
- Implemented three distinct AI-driven stylization models, allowing users to seamlessly transform their images with advanced visual effects

2022 **MIPS Single Cycle Processor**
Computer Architecture
- Designed registers, functional logic, and control subsystems using VHDL, ensuring robust and efficient processor operation
- Developed a custom architecture supporting 16 instruction types, including arithmetic operations, data movement, branching, and jump instructions
- Conducted extensive simulations to verify functionality, demonstrating the processor's ability to compute the Fibonacci sequence recursively up to the 15th digit, validating the design's correctness and performance

2021 **Car-Bedded**
Embedded Systems
- Designed and implemented software solutions for precise control of servos and motors, aligning functionality with detailed datasheet specifications and microcontroller architecture requirements
- Incorporated UART and I2C communication protocols to enable efficient data transfer between devices, ensuring seamless hardware integration and reliable system operation
- Leveraged the Raspberry Pi platform and RISC-V ISA development environment to build a flexible and scalable control system, optimizing performance for embedded applications

ORGANIZATIONS

2024 **Institute of Information Sciences (I2S) Student Organization**
Founding Treasurer
- Contributed to the coordination of the regional I2S Student Research Symposium (ISRS), bringing together innovative minds.
- Secured funding for the ISRS event by crafting compelling proposals and contributing to the event's conceptual framework.