

Alan Manuel Loreto Cornídez

Electrical and Computer Engineering Student, Computer Architecture Enthusiast, Linux Lover.

Contact Information

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Currently

Completing undergraduate studies in electrical and computer engineering at the University of Arizona with an expected graduation date of May 2023. I am in the Accelerated Master Program (AMP) at the University of Arizona and expect to graduate with a master of computer engineering in May 2024.

Education

Alta Vista High School, Tucson Arizona

August 2015 - May 2019

High School Diploma Recieved

The University of Arizona, Tucson Arizona

August 2019 - May 2023

Electrical and Computer Engineering, Bachelor of Science 2023

Research Experience

Lab Research Assistant | Heterogeneous Computing

[Reconfigurable Computing Lab](#) | [Tucson, Arizona, United States](#)

June 2022 - Aug 2022

Worked in the compositional systems lab as part of the Ronald E. McNair Post-Baccalaureate Achievement Program.

Optimized convolution scripts to allow faster computation times.

Presented my summer research titled, "Application Development and Pre-Silicon Design Analysis for a Heterogeneous Computing System" at the 2022 McNair Conference.

Conducted literature review with lab colleagues and presented aforementioned literature review to the Principle Investigator.

Software Engineering Research Assistant | Autonomous Vehicle Research

[Compositional Systems Lab](#) | [Tucson, Arizona, United States](#)

Jan 2021 - May 2021

Designed a multi-threaded data compression script that got implemented into the data processing pipeline.

Collaborated with advisors to discuss and set project design parameters.

Made a project showcase video demonstrating the process of each team's contribution to the project.

Presentations

Application Development and Pre-Silicon Design Analysis for a Heterogeneous Computing Platform

[Abstract](#)

As computing applications become increasingly complex and widespread, the demand for powerful and efficient computer designs has significantly increased. However, simply increasing raw processor speed renders major diminishing returns. The need to implement heterogeneous computing techniques – that is, utilizing specialized hardware that is optimized for the application at hand – is apparent. By using multiple computer architectures and hardware accelerators such as scalar processors, vector processors, and/or domain specific systems on a chip (DSSoCs) in a computer system, we can achieve performance gains beyond those that are possible with raw increases in processor speed. While execution time and power consumption characteristics are improved, this comes at the cost of a greater design

complexity, requiring additional effort in hardware accelerator integration, resource management, and application development. These issues are addressed at the pre-silicon design stage in the Compiler-Integrated Extensible DSSoC Runtime (CEDR) framework. CEDR provides/combines many design features that help a hardware system designer conduct the cost-benefit analysis for different hardware implementations. The present study focuses on utilizing CEDR to implement multiple computer applications, such as a computer vision lane detection algorithm and a 5G protocol stack. This allows for analyzing how various hardware configurations affect the performance of the application. Power consumption, execution time, and scheduling characteristics are taken into consideration during the pre-silicon design stage to determine a cost-benefit analysis of implementing DSSoC hardware accelerators for these applications.

Professional Experience

Ungraduate Lab Asisstant | Introduction to Computer Architecture

The University of Arizona | Tucson, Arizona

Aug 2022 - December 2022

Assist students with hardware design implementations using Verilog.

Assist students with MIPS assembly language implementations.

Understand and explain computer architecture concepts to students.

Help students optimize their MIPS and Hardware implementations.

Understand, follow, and enforce lab safety protocols.

Amazon Customer Fulfillment | Warehouse Associate

Amazon | Tucson, Arizona, United State

Jul 2022 - Present

Conduct warehouse operations to fulfill customer needs.

Prepare colleagues' workspace to optimize their workflow.

Applications Engineering Intern | Apex Microtechnology

Apex Microtechnology | Internship | Tucson, Arizona, United States

Compiled and synthesized characterization data for a series of company products. May 2021 - May 2022

Collaborate dynamically with my teams to bring projects to fruition.

Understand and work on critical path objectives.

Utilize electronic device hardware to analyze company products for failure analysis.

Honors, Awards, and Distinctions

Academic Distinction

College of Electrical and Computer Engineering | Spring 2020

College of Electrical and Computer Engineering | Fall 2020

College of Electrical and Computer Engineering | Spring 2021

College of Electrical and Computer Engineering | Fall 2022

College of Electrical and Computer Engineering | Spring 2022

Professional Affiliations

Arizona Autonomous Vehicles Club

The University of Arizona | Vice President, Secretary

August 2022 - Present

Vice President of the Arizona Autonomous Club, worked with Club President to design, build, and compete with an autonomous flying vehicle that fulfills competition requirements.

Assemble a large scale unmanned aerial vehicle (UAV) from frame parts, electronic parts.

Lead the Hardware team to complete UAV build objectives.

Complete meeting notes and officer scheduling and action items.

BAJA Racing

The University of Arizona | Electrical Sub Team Member

August 2020 - May 2021

Collaborate with team members with the goal of designing, building, and competing our race car. Soldered USB Hubs, diagnosed multiple wireless data transmitters.

Assemble electrical systems to complete competition objectives.

Debug electrical parts to ensure proper functioning of wireless data transmission.

References

Dr. Ali Akoglu

Professor
Reconfigurable Computing Lab
Electrical and Computer Engineering
The University of Arizona
Email: akoglu@arizona.edu

Dr. Andrew Huerta

McNair Program Director
Assistant Professor of Practice, UROC Programs
Graduate College
The University of Arizona
Email: ahuerta@arizona.edu

Relevant Coursework

ECE 369 | Introduction to Computer Organization/Architecture
ECE 373 | Introduction to Software Engineering
ECE 442 | Digital Control Systems
ECE 462 | Advanced Computer Architecture
ECE 513 | Web Development and The Internet of Things
ECE 529 | Digital Signal Processing
ECE 532 | Digital Image Analysis
ECE 569 | High Performance Computing

Research Interests

Computing and Computer Architecture

Heterogeneous Computing
High Performance Computing
RTL Design
Autonomous Systems

Signals and Communications

Digital Signal Processing
Control Systems