

# Dylan-Matthew Garza

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## Objective

Computer Engineering student graduating in December 2024 seeking an engineering role in embedded Linux development, and Linux systems development.

## Skills Summary

- Embedded Linux development with Yocto Project
- bitbake, OpenEmbedded, U-Boot, OP-TEE, TF-A
- Toolchains, SDKs, BSPs
- Systems Programming: C/C++, Rust
- Scripting: POSIX/bash/python
- git version control and command line interface
- Dynamic binary analysis with Intel's PinTool
- Full-stack web development: Web Assembly, Rust, javascript/typescript, HTML/CSS
- Microcontroller development for Arm Cortex-M4
- Microcontroller peripheral: CAN, DRAM, I2C, UART, SPI, JTAG
- Object-Oriented Programming for applications with C++ and Java
- TCP/IP,UDP
- Linux server administration
- Security: PKI, SSL/TLS
- Docker, qemu, NixOS

## Education

**B.S. in Computer Engineering and Minor in Mathematics**

Western Michigan University - Kalamazoo, Michigan

Expected: December 2024

## Experience

### ZF Group, Research and Development Intern

August 2024 - Present

- Design and implement a device with capabilities to test different vehicle components to determine if specifications are met
- Streamline device testing and test data handling and interpretation
- Using Yocto Project to build a custom embedded linux image for the Arm Cortex-A7 architecture
- Integrate custom device tree into Linux kernel recipe
- Designed an interactive web application for testers implemented fully in Web Assembly with the Yew framework in Rust
- Designed a Rust backend application to handle HTTP requests and communicate to an onboard microcontroller (Arm Cortex M4) using interprocess communication (IPC) through the OpenAMP framework project

### Resideo, Embedded Linux Engineer Intern

May 2022 - August 2022

- Successfully integrated debuginfod, a file server, into CI/CD pipeline in order to make the debugging workflow and analyzing core files of embedded Linux images simpler and more efficient.
- Developed shell/bash scripts to automate tasks
- Learned about the Yocto Project to develop custom reproducible embedded Linux images
- Wrote technical documentation and gave a presentation on how to utilize tools
- Learned the principles of agile development to improve software velocity, reduce bug count and decrease time to market

- Constructed and tested various components of battery packs and battery cells
- Worked with engineers on prototyping new designs of battery packs
- Followed safety procedures to ensure a safe working environment

## Projects

### System Resource & Window Management Bar

July 2024 - Present

- Developed a fully custom status bar utilizing Eww Widgets (standalone widget system implemented in Rust) for the Hyprland Wayland Compositor
- Dynamic workspace display implemented using C through UNIX sockets, interprocess communication and signal handling
- System statuses fetched real-time using compiled C and Rust binaries include SSID, Wi-Fi connectivity, IPv4 address, RAM usage, battery capacity, and time/date
- Styled in GTK SCSS
- [Link to Project Github Repository](#)

### Simulation of Fixed-length Vector Architecture Superpipeline

November 2023 - December 2023

- Simulated a pipeline for a vector processor in fully Object-Oriented C++
- Utilized Intel's PinTool to dynamically profile binary for vector instructions (AVX/AVX2) to generate a custom trace file
- Supported Variable single-instruction multiple-data (SIMD) lanes
- Implemented 6-stage pipeline (fetch, decode, issue, execute, commit)
- Out-of-order execution through Tomasulo's algorithm (method of dynamic instruction scheduling and out-of-order execution) with a fixed issue width

### Dynamic Conveyor Belt Positioning System

April 2023

- Designed and implemented a system utilizing an STM32 microcontroller
- Move an object on a conveyor belt from start to end position
- Using peripherals such as LED indicator, IR emitter, Ohm speaker, and relay switch
- Design H-Bridge motor driver module, and motor encoder module
- Write microcontroller program (using IAR Workbench and STM32CubeMX) that adjusts frequency/duty cycle adjustments based on input signals

### Custom 10-bit CPU

January 2023 - April 2023

- Designed a custom 10-bit ISA and simulated a 5 stage pipelined CPU using the Verilog HDL
- CPU was implemented with two-level memory hierarchy with cache and RAM.
- Branch predictor was also implemented as a 2-bit predictor with a branch history register and pattern history table
- Wrote machine code for bubble sort, string copy, and multiply programs

## Certifications

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### **LFD 460:Embedded Linux Developement with Yocto Project**

August 2022

Gained expertise in developing custom embedded Linux systems through the Yocto Project, encompassing advanced tool usage and IDE integration for efficient embedded product development.

[Credly Badge](#) | [Linux Foundation Certificate](#)