PATRICK NOWAKOWSKI

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RESEARCH EXPERIENCE

WEMPEC | University of Wisconsin - Madison
Undergraduate Researcher / Research Intern | September 2022 – Present

- Developed embedded systems firmware for control of advanced motor drives
- Worked on circuit board design, fabrication/assembly, and testing
- Designed Xilinx IP blocks for FPGA and wrote corresponding C driver code
- Implementing dual-core FreeRTOS on Zynq-7000 based platform

ECE 399 | University of Wisconsin - Madison
Independent Study Research | September 2023 – Present

- Researching effects of varying frequencies in power electronics systems on current ripple, using MATLAB/SimuLink
- Research guided by Prof. Giri Venkataramanan, Prof. Eric Severson, and Nathan Petersen (PhD Mentor)

EDUCATION

University of Wisconsin - Madison
M.S. Electrical Engineering | May 2026
Advisor: Daniel Ludois

University of Wisconsin - Madison
B.S. Computer Engineering | May 2024
Double Major: Computer Sciences
GPA: 3.7 / 4.0

University of Wisconsin - Green Bay
College Credit in High School Program | September 2018 – June 2020

WORK EXPERIENCE

College of Engineering | University of Wisconsin - Madison
Student Orientation Advisor | May 2024 – August 2024

- Lorem ipsum dolor sit amet

Plexus Corp. | Neenah, WI
Digital Engineering Intern | June 2023 – August 2023

- Developed hardware testing and debugging skills on supercomputer project, focused on RGMII for Gigabit Ethernet
- Worked on 3U CubeSat project as designer for On-board Computer PCB and interim Project Manager

Constellation Energy | De Pere, WI
IT Architecture Intern | June 2022 – August 2022

- Assisted in building real-time clean energy matching platform using Azure and Microsoft SSMS
- Participated in development using agile delivery model and professional development seminars

UW Makerspace | University of Wisconsin - Madison
Technical Staff | February 2022 – May 2022

- Aided and trained students in use of FDM, SLA, and SLS 3D printers, as well as laser cutter/engraver and shop tools

Electrical & Computer Engineering Department | University of Wisconsin - Madison
Undergraduate Student Teaching Assistant | September 2021 – Present

- Assisted teaching introductory computer engineering, signals, Verilog HDL, and circuit analysis courses
- Facilitated discussions, and answered individual and group student questions on in-class learning exercises

Associated Bank | Green Bay, WI
IT Service Delivery Intern | May 2021 – August 2021

- Received hands-on experience in on-premise vs cloud infrastructure models
- Cataloged server maintenance scripts for version control, developed standards and documentation for corporate GitHub

Best Buy | Green Bay, WI
PC Sales Associate | October 2018 – April 2020

- Sold computers, tablets, and accessories, as well as credit cards and store memberships
- Developed skills in selling and building positive interactions with consumers

VOLUNTEER EXPERIENCE

Engineering EXPO | University of Wisconsin - Madison
Executive Chair | May 2024 – Present

- Train and delegate tasks to EXPO committee members

Engineering EXPO | University of Wisconsin - Madison
Student Exhibits Committee Chair | September 2023 – May 2024

- Work with EXPO committee members and engineering student organizations to organize exhibits
- Recruit industry professionals and University of Wisconsin engineering alumni to judge exhibits

Engineering EXPO | University of Wisconsin - Madison
Student Exhibits Committee Member | September 2022 – May 2023

- Assisted Student Exhibits Committee Chair in tasks: organizing exhibitors and planning exhibit scavenger hunt
- Volunteered to help run FPGA exhibit on day of event

PROFESSIONAL AFFILIATIONS

Institute of Electrical and Electronics Engineers (IEEE)
Member | December 2022 – Present

- *Eta Kappa Nu Honor Society Member* as of 09 February 2024

ACADEMIC DESIGN PROJECTS

Advanced Motor Drive Control – Digital-to-Analog Converter Expansion PCB (Independent Study Project)

- Learned Altium PCB design software and created updated I/O interface for motor drive DAC expansion board
- Ordered components for PCB assembly and design verification testing

32-bit RISC-V Processor Design (Computer Architecture Course Project)

- Designed 5-Stage Pipelined Processor with Cache System for 32-bit RISC-V Instruction Set Architecture

Pineapple Samurai, 64-bit RISC-V Processor Design Project (ECE 554 Capstone Project)

- Created "Pineapple Samurai" game that runs on custom pipelined 64-bit RISC-V processor in Altera FPGA
- Written in C, utilizes camera tracking through color detection, processor supports integer multiply and divide

(SOME) PERSONAL PROJECTS

Undelineated Morse Decoder

- Given a string of undelineated (unseparated) dots and dashes, what is most likely the original message in Morse Code?
- This was good practice of programming efficient algorithms

Door Smart Lock

- Electromechanical passion project using Home Assistant, Raspberry Pi, and ESPHome.

4x4 Rubik's Clock Puzzle

- Mechanical project in which I designed a custom Rubik's *Clock* Puzzle, scaled from the usual 3x3 up to a 4x4
- Designed in SolidWorks, printed on a Creality Ender 3 FDM printer

SKILLS

Design: SolidWorks CSWP, Ultimaker Cura, Altium, Vivado/Xilinx SDK, LTSpice, 3D Printing (FDM, SLA)
Technical: Microcontrollers (TI, Arduino, STM32), FreeRTOS, RISC-V, Git, GitHub, Java, C/C++, C#, Python, Verilog, MATLAB/SimuLink

RELEVANT COURSEWORK

- ECE 353: Microcontoller Programming
- ECE 399: PCB Design & Current Ripple Research
- ECE 551: FPGA Design & Synthesis
- ECE 552: Computer Architecture
- ECE 554: Digital Engineering Laboratory
- ECE 555: VLSI Design
- ECE 901: Special Topics in VLSI Design
- ECE 355: Electromechanical Energy Conversion
- ECE 412: Power Electronics