ELIJAH HOUSE

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EDUCATION

Colorado State University Fort Collins, CO — *Current*
Ph.D. in Mechanical Engineering

Purdue University— IUPUI, Indianapolis, IN — *May 2022*
B.S. in Mechanical Engineering (GPA 3.7/4.0)

Marian University, Indianapolis, IN — *May 2022*
B.S. in Applied Mathematics — Honors: Cum Laude (GPA 3.6/4.0)
Minor in Physics

EXPERIENCE

Marian University — January – May 2021
Research Assistant — *Indianapolis, IN*

- Collaborated with a small team to create iron-nanoparticles to be used for evaluating electrical properties of polyvinylidene (PVDF) films
- Tested PVDF polymers of different sizes by using a Raspberry Pi to run electrical signals through the polymer to observe the change in the magnetic field
- Compiled notes and papers to rewrite a new abstract for a paper that shows the potential in the research

Gray Goat Bicycle Company — May 2020 – May 2021
Store Manager, Bicycle Mechanic — *Indinapolis, IN*

- Organized a new service system to bring down a three-week backlog during COVID-19 pandemic, providing customers with workorders when promised
- Completed industry specific online education courses on mechanics, sales, and business to run the store more efficiently
- Managed shop and customer demand during supply chain shortages, coming up with creative solutions to their problems

ENGINEERING PROJECTS

Senior Capstone Design — January – May 2022

- Collaborated with a small group to produce a kitting cart to increase worksite efficiency for a local construction robotics startup company
- Organized weekly meetings with team members, sponsors and professors to keep the project within deadlines
- Analyzed CAD drawings using FEA in ANSYS to ensure cart could bear the weight of painting equipment

Bicycle Wheel Geometry Optimization — January – May 2022

- Modeled a bicycle wheel that balances weight and safety by maximizing lateral, radial, and torsional stiffnesses while minimizing weight
- Developed MATLAB scripts to perform reliability based design (RBD) to get optimal design variables that satisfy minimum probability of failure requirements
- Compared RBD MATLAB results to an evolutionary algorithm modeled in Excel to achieve a wheel four times lighter and more safe

Machine Learning Project January – December 2021

- Integrated physics into a deep neural network (DNN) algorithm to solve the Burger's equation and found the velocity profile of a shockwave that satisfy initial and boundary conditions
- Developed MATLAB scripts to train a model on a custom DNN
- Verified DNN prediction, proving that a DNN could be used for estimating PDE's without the need for numerical methods

Mathematics Senior Research August – December 2021

- Researched hybridization of the stochastic tunneling algorithm for global optimization, focusing on the mathematics behind the algorithms and the applications
- Presented my research to the math department and wrote a technical paper explaining the mathematics used in stochastic tunneling algorithms

Smart Mirror May – July 2020

- Designed and developed a smart mirror that functions as both a reflective mirror and electronic screen
- Produced a smart mirror using a Raspberry Pi, Linux, JavaScript, and open-source API's that displays real time information such as reminders, weather, Spotify data, and calendar events

HONORS AND AWARDS

Dean's list	8 semesters
Marian Athletic Award Scholarship for Cycling	
Member of Sigma Zeta	National science and mathematics honor society
USA Cycling Academic All Star	8 semesters competing in USA Cycling National Championships while holding at least a 3.5 GPA

SKILLS

Programming	MATLAB (optimization and machine learning toolboxes), C++, Linux, Raspberry Pi
Software	PTC Creo, ANSYS, MiniTab, Adobe Photoshop, Premiere Pro

GRADUATE COURSEWORK

Design Optimization	Probabilistic Eng. Design
Fluid Mechanics	Machine Learning for ME

ACTIVITIES

Marian University Cycling Team August 2017 – May 2022
Team Leader / Mentor *Indianapolis, IN*

- Volunteered as an ambassador for the MS Foundation, connecting the team with the Bike MS division
- Competed in 10 different national championships, winning 7 team championships
- Balanced a full course load with 15 to 20 hours of training a week, travel, and mentorship to new members

Texas Roadhouse Cycling Team October 2019 – Present

- Won the elite points race at the USA Cycling Track National Championships against the best track cyclists in the country
- Placed second in the Team Pursuit event at the National Championships, improving over 19 seconds in the 4km event after dedicated training with the team

REFERENCES

Jeffery Carvell
Advisor from Marian University
(317) 955-6504 — jcarvell@marian.edu

Dean Peterson
Coach from Marian University
(317) 446-4478 — dpeterson@marian.edu