Akash Mattupalli

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Education

Purdue University **Expected Graduation: May 2024**
Bachelor of Science in Mechanical Engineering *GPA: 3.74/4.00*
Minor in Global Engineering Studies

Universidad Carlos III de Madrid (UC3M) **Jan 2023 – Jun 2023**
Global Engineering Alliance for Research and Education (GEARE) Program

Research Experiences and Lab Projects

Warsinger Water Lab **Sep 2023 – Present**
Advisor: Dr. David Warsinger

- Collaborating with a team to construct a desalination device powered by tidal energy to participate in the Marine Energy Collegiate Competition (MECC)

Transport: Modeling, Numerics & Theory Lab **Summer 2021, Aug 2023 – Present**
Advisor: Dr. Ivan Christov

- Using DeepXDE neural networks to find viscoelastic parameters of non-Newtonian thermal greases
- Simulating rheological tests of different shear rates using the Thixotropic-Elasto-Visco-Plastic model for a shear thinning thermal grease
- Modeled the movement of ferrofluid droplets in static and harmonic magnetic fields using Python and Jupyter Notebooks and performed ferrofluid droplet simulations on Purdue's Scholar computer cluster

DeBoer Lab **Jan 2022 – Present**
Advisor: Dr. Jennifer DeBoer

- Developing engineering curriculum and lessons on sensors in EngStarter learning kits for displaced community in an LGBTQ home in Indianapolis
- Collaborated with Dr. Chad Jafvert and Dr. Dhinesh Radhakrishnan to create a contextualized water filtration course and an inventory to build slow sand filters for all-girls high schools in Mwenezi, Zimbabwe
- Led a literature review to identify the differences and similarities between American engineering and Indian ethno-engineering, and presented findings in a manuscript format

Fluid Mechanics Open Lab Project **Oct 2023 – Present**
Instructor: Dr. Jun Chen

- Designing a wind tunnel experiment with two team members to model the lift and drag coefficients during the phases of flight and investigating the effects of changing a model airfoil's angle of attack on the coefficients

Search Algorithms in Pacman Environment Project **Apr 2023 – Jun 2023**
Instructor: Dr. Raquel Fuentetaja Pizan

- Investigated execution times and expanded nodes of blind and heuristic search algorithms in different Pacman mazes with single and multiple food dots
- Created various Pacman mazes to find weaknesses in existing blind and heuristic search algorithms, and implemented Octile Distance as a new heuristic to improve on existing heuristics

Purdue Electric Racing Projects **Jan 2021 – Sep 2022**

Vehicle Dynamics Sub-team

- Collaborated with two sub-team members to construct upright brackets using CNC 5-Axis Milling and Fusion 360 CAM
- Designed the brake line system of the car and identified parts and fittings required
- Created jigs on Solidworks to install tabs onto the chassis and manufactured gusset plates and their tabs for the car with a laser-cutting machine and angle grinder

Electrical Engineering Fundamentals I Lab Project **Mar 2022 – May 2022**

Instructor: Dr. Benjamin Manning

- Devised an audio equalizer with a low-pass, band-pass, and a high-pass filter with op-amps to amplify the voltage of sound signals from an audio source

Mechanical Engineering Design, Innovation and Entrepreneurship **Jan 2022 – May 2022**

Instructor: Dr. Morgan Murphy

- Led a team of four to innovate a new crutch design that alleviates user discomfort using Solidworks, based on market research conducted online using Google Forms
- Carried out poster presentations to industry experts to demonstrate the 3D printed mock-up model of the crutch and its improved functionality in user comfort and support

Honors and Awards

Early and Noel Denison ME Global Services Learning Experience Scholarship Fall 2023
Scholarship of $1500

Semester Abroad in Intercultural Learning (SAIL) Scholarship Spring 2023
Scholarship of $2000

General Mechanical Engineering Undergraduate Scholarships Spring 2021, Spring 2022
Scholarships of $1500 each

Mechanical Engineering Summer Fellowship Summer 2021
Fellowship of $1000

Dean's List and Semester Honors Fall 2020, Spring 2021, Fall 2021, Fall 2022

Dean's List Spring 2022

Personal Projects

AI Poetry Generator **Summer 2021**

- Followed Tensorflow's *NLP Zero to Hero* playlist to create poetry using recurrent neural networks and LSTMs.

Sentiment Analysis on text **Summer 2022**

- Performed sentiment analysis using Python's NLTK Toolkit on qualitative data from auto-ethnographic research for the DeBoer Lab.

Professional Experiences

Remora **Jun 2023 – Aug 2023**

Controls Engineering Intern, Carbon Capture *Wixom, MI*

- Organized and simplified the microcontroller's data dictionary in MATLAB Simulink
- Designed the MATLAB Stateflow chart for the pre-charger circuit of the compressor motor
- Coded MATLAB input processing scripts to run a simulation program
- Conducted data analysis on how alternators and back pressure affect fuel consumption using SQL Queries, Python and Jupyter Notebooks with Pandas and NumPy modules
- Presented final findings and deliverables to the Controls and Electronics team

Republic of Singapore Navy **Mar 2019 – Oct 2020**

Service Supply Assistant, National Service *Singapore, Singapore*

- Led a team of eight to handle the Medical Logistics store of the Naval Base's Medical Center
- Mentored and guided new recruits to deliver their duties efficiently in medical logistics procedures

Skills

Languages: English (C2), Telugu (C2), Hindi (C2), Spanish (B2), Mandarin (A2)
Software: Python (Pandas, NumPy, DeepXDE), MATLAB (including Simulink and Stateflow), C, SQL, VHDL, LabVIEW, Solidworks, Fusion 360
Manufacturing: CNC Lathe, 5-Axis Mill, Manual Mill, Manual Lathe, 3D Printing, Laser Cutting

Campus Involvements and Programs

Mechanical Engineering Mentor **Aug 2023 – Present**

- Guiding a group of eight sophomores majoring in Mechanical Engineering with internships, research, and study abroad experiences
- Presented my study abroad and global experiences to 300 sophomores

Global Engineering Alliance for Research and Education (GEARE) **Aug 2021 – Present**

- Led discussions in Spanish in LC 490: Humanities-Informed Engineering Projects on the intersection of humanities and engineering using various real-life contexts in South America
- Carried out a poster presentation on global experiences from study abroad semester in Madrid to the GEARE cohorts

Literary Publications and Essays

Mattupalli, A. 2022. "Diwali", *Mahogany Journal*, Issue 4, pp. 16-17 [link]

Mattupalli, A. 2022. "Ashes in the River Thames and other stories", self-published short story chapbook [link]

Mattupalli, A. 2021. "Mirror World", self-published poetry chapbook [link]

Mattupalli, A. 2020. "Using Asimov's 'I, Robot' to understand Morals and Ethics", posted on *Medium* [link]

Mattupalli, A. 2020. "Ganesh Chaturthi", *Mahogany Journal*, Issue 2, pp. 33-34 [link]

Mattupalli, A. 2020. "Looking into the marriage of Language and Expression", posted on *Medium* [link]

Mattupalli, A. 2019. "Merah", *Contour: A Lyric Cartography of Singapore*, pp. 76, ISBN: 9789811421617