# SAAKETH MEDEPALLI

(269) 359-5488 • https://www.linkedin.com/in/smedepalli/ • saakethm@umich.edu

## EDUCATION

**University of Michigan – College of Engineering,** Ann Arbor, MI *December 2022*
*Bachelor of Science in Electrical Engineering*, ***GPA: 3.98/4.00*** (Dean's List, University Honors)
Relevant Coursework: Principles of Machine Learning, Deep Learning for Computer Vision, Mathematical and Computational Neuroscience, Data Structures and Algorithms

## RESEARCH

**The Allen Institute, MindScope Program**
*Summer Intern, Visual Behavior Team* *June 2022 – August 2022*

- Developed Generalized Linear Models (GLMs) to understand function of VIP (Vasoactive Intestinal Polypeptide-expressing) neurons in mouse visual cortex during surprise-driven task
- Presented results at internal presentation and at a computational neuroscience conference

**University of Michigan, Department of EECS**
*MANOPT Group (Prof. Qing Qu)* *January 2022 – Present*

- Conducting experiments to understand the relationship between Neural Collapse (empirical phenomenon in deep neural networks) and robustness (under adversarial attacks, label noise)

*Lu Group (Prof. Wei Lu)* *November 2020 – May 2022*

- Proposed and helped develop concept for the emulation of neocortical networks using a crossbar architecture comprising artificial synapses (memristors) for energy-efficient learning
- Helped project members to build simulation in Python using memristor learning rules
- Contributed to work being published in a peer-reviewed journal

*PetersonLab (Prof. Becky Peterson)* *March – November 2020*

- Worked on manuscript for a paper detailing the construction and characterization of a novel thin film diode
- Analyzed experimental data in Microsoft Excel and Origin for insulator-based conduction models

**Western Michigan University**, Kalamazoo, MI
Condensed Matter Physics Lab (Prof. Clement Burns) *October 2018 – May 2019*

- Conducted solid state crystal growth in four phases and interpreted results using microscope analysis, X-ray Powder Diffraction

## AWARDS

- 2022 EECS Outstanding Research Award *April 2022*
- 2021 A.D. Moore Award Finalist *February 2021*
- Donald D. Dodge Scholarship *August 2020*
- University of Michigan Regents Merit Scholarship *August 2019*
- Intel International Science and Engineering Fair (ISEF) Finalist in Phoenix, AZ *May 2019*
- 2018 Michigan Mathematics Prize Competition Top 100 in State *March 2019*
- United States of America Computing Olympiad (USACO) Gold Division Qualifier *January 2019*

## TEACHING

**University of Michigan EECS Department**

*EECS 351 (Digital Signal Processing) Instructional Aide* *January 2022 – May 2022*

- Organized and led weekly discussion sections for 70 students, hosted weekly office hours for questions
- Advised ~15 project groups for a final project spanning signal processing applications

*EECS 200 (Electrical Engineering Systems Design I) Instructional Aide* *August – December 2020*

- Taught 2 lab sections of ~6 students each in a core Electrical Engineering systems design class involving a robot and utilizing C & Unix programming, circuit design, control, and signal processing tools
- Evaluated and restructured class during weekly meetings with the instructor to enhance students' learning experience

**University of Michigan Math Lab –** Tutor & Manager *January – June 2020 & 2021*

- Tutored students in introductory math courses (Calc I, II, Multivariable Calculus, Differential Equations, and Linear Algebra)
- Managed groups of ~15 students for course administrative assistance and ~8 tutors for lab operations

## PUBLICATIONS

Yoo, S., Park, Y., Wang Z., Wu, Y., **Medepalli, S.**, Thio, W., Lu, W. D. (2022). Columnar Learning Networks for Multi-Sensory Spatiotemporal Learning. *Advanced Intelligent Systems*. (In Production). https://doi.org/10.1002/aisy.202200179

## PRESENTATIONS

"VIP Inhibitory Neurons in the Visual Cortex Perform Two Types of Predictive Processing: Stimulus Specific & Non-Specific," *Neuromatch Conference.* https://conference.neuromatch.io, September 2022.

"Novel Approach to Efficient Growth of Iron Selenide (FeSe) High-Temperature Superconductors," *Intel International Science and Engineering Fair*. Phoenix, AZ, May 2019.

## PROJECTS

*Real-time Spatial Audio System* *September 2022 – Present*

- Developing the software on an audio processing system in Python for real-time spatial audio using head-related transfer functions (HRTFs)

*Neural Collapse in Meta-Learning* *October 2022 – Present*

- Developed idea to investigate the phenomenon of neural collapse in prototypical networks
- Running ablation experiments in PyTorch to empirically test the idea

*Custom-Built Neural Network* *October 2021 – December 2021*

- Wrote a neural network from scratch in Python and benchmarked against libraries (i.e., PyTorch)
- Analyzed techniques for optimization and higher accuracies in both shallow and deep architectures

*Engram Temporal Correlation* *October 2021 – December 2021*

- Built a Hodgkin-Huxley neuronal network model to understand computational basis of correlation between temporally close memory networks (engrams) as observed in Lateral Amygdala (LA)

*Mood Classifier* *February – April 2021*

- Created a music classifier involving audio dataset curation, DSP feature extraction (Spectral Centroid/Bandwidth, MFCC, Chromogram) and classification (k-NN, SVM, Neural Network)

## SKILLS

*Languages*: Python (NumPy, Matplotlib, SciPy, scikit-learn, PyTorch), C++, Java, Matlab
*Tools*: bash, zsh, Git, Vim

## ACTIVITIES

**Michigan Sahana –** Treasury Chair/Board Member *December 2020 – 21*

- Raised over $7000 for the Indian Classical Music and Dance group on UM campus
- Managed financial accounts, expenses and budgeting of resources for the student organization to continue tradition of spreading Indian Classical Music and Dance on and off campus
- Organized the inaugural nation-wide conference *Kalā Sāgara* for similar-minded student organizations across the nation, including performances from professionals (Raised $5000 for the event)
- Hosted fundraisers on UM campus to promote events by the organizations

## OTHER EXPERIENCE

**Michigan Electric Racing Team –** EV/Powertrain Subteam *September 2019 – April 2020*

- Helped design the 2nd revision of DC/DC Converter PCB schematic and layout using Altium

**Michigan Hyperloop Team –** Power Subteam *September – December 2019*

- Designed diagram for high power system and created low power system PCB layout in Altium