

Akshita Ramya Kamsali

West Lafayette, IN (Open to relocation)

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Education

PhD in Electrical and Computer Engineering

Purdue University, IN, USA

Jan 2021 - Present

GPA: 3.76/4.0

Courses: Computer Vision, Probabilistic Graphical Models, Deep Learning, Artificial Intelligence, Linear Algebra Applications, Random Variables, Graph Theory and Algorithms

B.Tech. in Electrical Engineering with Minor in Biomedical

Indian Institute of Technology (IIT) Hyderabad, India

Aug 2016 - May 2020

Major GPA: 9.00/10 Minor GPA: 9.83/10

Courses: Convex Optimization, Statistical Inference, Topics in Information Theory and Coding, Digital Signal Processing, Neuro-physiological Signal Processing, Advance VLSI Design in LTSpice and Cadance

Experience

Robot Vision Lab, Purdue University

Graduate Research Assistant, Dr. Avinash Kak

July 2022 - Present

- Construct and analyze knowledge graph to detect changes in time-evolving private documents, applied to highly sensitive and private documents. **[Skills: PyTorch, Langchain, Pandas, Scipy, NetworkX]**
- Expert consultant for two projects for detecting trace materials utilizing Raman spectroscopy analysis with classical and deep learning models to enhance security measures and accuracy. **[Skills: Signal Processing, Fourier Transforms, PyTorch, matplotlib]**
- Designed a Conditional-Generative Adversarial model to generate Raman spectra — spectra indistinguishable from real spectra generates. Performed further artifact and edge detection to validate. **[Skills: Signal Processing, PyTorch, matplotlib, Seaborn]**
- Mentoring two PhD students and one MS student on NLP and Hardware-Software co-design for efficient and accelerated computing. Teaching good coding and documentation practices for technical collaboration.

Elmore Family School of Electrical and Computer Engineering, Purdue University

Graduate Teaching Assistant

Jan 2021 - Apr 2024

- **Deep Learning:** Served as Head TA for a graduate class of 120 students. Developed state-of-the-art programming and theory assignments to facilitate learning in deep learning applications for various modalities like computer vision (CV) and natural language processing (NLP) along with reinforcement learning (RL).
- **ECE Fundamentals I:** Led and managed a large class of 700 students, overseeing 12 GTAs and 40 UTAs. Mentored 80 students to build Audio Equalizer on breadboard with fundamental concepts of RC/RL filters, buffers and amplifiers.
- **Computer Security:** Acted as a GTA for a class of 203 juniors and seniors. Designed homework assignments and exams for DSA and SHA encryption, spam filtering and DNS attacks. Communicated the above technical concepts in both one-on-one and group settings, and provided support to help students improve their grades.

IIT Hyderabad

Teaching Assistant

Jan 2018 - May 2020

Digital Signal Processing, Probability, Statistics, Data Structures, Linear Algebra, Vector Calculus, Advanced VLSI Design, EE Senior Project

University of Tokyo

Exchange Student, Dr. Hideyuki Horii

July 2018 - Aug 2018

- Analyzed infant mortality rates across Japan and India via interviews and literature. Communicated with multi-lingual stake holders through written and oral reports. **[Skills: Literature survey, survey question curation for various cultures and demographics]**
- Mentored 4 high school students to analyze data, visualize and recommend plans to improve premature infant survival rates. **[Skills: Matplotlib, Seaborn, Statistical Analysis and Significance Tests]**

Wisig Networks

Summer Research Intern

May 2018 - July 2018

- Developed a robust and optimized Down-link Channel by integrating physical and MAC layers for 5G test-bed communication modules — improved throughput of the link by 13%. **[Skills: C, Embedded C]**

Skills

Technical: Python, git, C++, C, MATLAB, \LaTeX , Linux, Docker, SLURM, bash

ML/Data Science: PyTorch, PyTorch Lightning, torch_geometric, networkx, JAX, Pydantic
Instructor, Langchain, HuggingFace, TRL, OpenCV, scikit-learn, Pandas, Tensorflow, WandB

Projects

ECoG Signal Processing for Mapping Cortex Processing Hierarchy in Squirrel Monkeys and Humans

Graduate Research Assistant, Dr. Joseph Makin

- Pre-processed and analyzed Electrocorticography (ECoG) signal from Auditory cortex of squirrel monkeys.
- Developed a mapping function between hidden representations of self-supervised Speech-to-Text models (e.g., wav2vec, DeepSpeech2) and neural responses in various regions of the auditory cortex, achieving an encoding performance with R^2 correlation ranging from 0.4 to 0.6. **[Skills: Pytorch, Seaborn, SLURM, Docker, TensorFlow]**
- Proposed and led the implementation of a novel Convolutional Transformer model for decoding neural activity to text across multiple GPUs. Achieved an 8% improvement in average Word Error Rate (WER) compared to an RNN-based baseline on the TIMIT dataset. **[Skills: Pytorch, Seaborn, SLURM, Docker, Tensorboard]**
- Mentored one ECE and one BME undergraduate student in motor cortex decoding from ECoG while writing using an RNN. Provided guidance on technical skills and research practices, including version control and reproducibility. Student received NSF GRFP under my mentorship. **[Skills: Technical writing, Coding and documentation practices]**

Thermal Barrier Coating Design and Fabrication

Graduate Research Assistant, Dr. Zubin Jacob, Department of ECE

- Designed and performed experiments to study absorption and reflection of radiation in IR region in W-YSZ stack for Thermal Barrier Coatings (TBC). Achieved 1000K temperature difference between layers.
- Simulated various alloy transmission and reflection properties when paired with YSZ. Simulations showed 1500K temperature difference. Further, fabricated the stack in cleanroom using various techniques. **[Skills: COMSOL, Python, Optics, Layer Deposition, Spin Coating]**

Carrier Dynamics in GaAs and TMDCs with Fluorescence Lifetime Imaging & Finite Element Analysis

Undergraduate Researcher, Dr. Naresh Emani, Department of EE

- Analysed Carrier Dynamics in GaAs and TMDCs using Finite Element Analysis in COMSOL Multiphysics[®].
- Used Single Photon Microscopy and Spectroscopy to calculate Fluorescence Lifetime and matched simulations.
- Studied Temporal dispersion of a signal and further understand role of BIC - Initial simulation and verification using Python — simulations to study Chirped Pulse Analyses. **[Skills: COMSOL, Python, Finite Element Analysis, Signal processing]**

Biomedical and Neurophysiological Signal Processing

Undergrad Researcher, Dr. Mohan Raghavan, Dr. Kousik Sarathy Sridharan, Department of BME

- Integrated large amount of motor systems data into a coherent model using NEURON and Python.
- Simulated ECG, EMG signal processor in TCAD and LabView and built it on breadboard with basic RC/RL filters, amplifiers and flip-flops to detect PQRS waves.

Publications

Experimental Verification of Enhanced Photoluminescence in p-doped GaAs using Fluorescence Lifetime Measurements, WRAP 2019

K. A. Ramya, T. Jinal, K. Saurabh and N. K. Emani

Service

President, ECE Graduate Student Association:

Reviewer, WiML@NeurIPS 2024: