# SAKTHI KUMAR ARUL PRAKASH

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3912 Ash Drive, Allison Park, PA 15101

## PROFESSIONAL SUMMARY

Experienced Machine Learning Engineer with a strong background in Deep Learning, Machine Learning and Computer Vision. Expertise spans Retrieval-Augmented Generation (RAG), Large Language Models (LLM), Diffusion Models and Graph Networks. Seeking to leverage expertise in model development, training, and deployment to drive innovative solutions in a dynamic ML environment.

## PROFESSIONAL EXPERIENCE

**Artian AI**                                                                                    New York City, NY
Machine Learning Engineer                                                          *May 2024 - Current*

**Carnegie Mellon University**                                                            Pittsburgh, PA
Postdoctoral Research Associate, Department of Machine Learning          *August 2023 - April 2024*
**Area of Research:** Geometric Deep Learning and Causal Structures in Physics

## EDUCATION

**Carnegie Mellon University**                                                            Pittsburgh, PA
Ph.D. in Mechanical Engineering                                              *August 2019 - August 2023*
**Area of Research:** Geometric Deep Learning and Graphical Models for studying Social Networks and Physics Simulations
**Awards:** Knight Fellowship                                                                    (2022)

**The Pennsylvania State University**                                                   State College, PA
M.S. in Industrial Engineering                                                  *August 2016 - July 2019*
**Area of Research:** Optimization Theory and Computer Vision for Healthcare

**Anna University**                                                                           Chennai, India
B.E. in Mechatronics Engineering                                                *July 2012 - May 2016*

## SKILLS

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|---|---|
| **Programming Languages:** | *Experienced-* Python, Matlab, SQL \| *Familiar-* C++, JavaScript, Java for Android Programming |
| **Frameworks & Tools:** | Pytorch, Pytorch Geometric, TensorFlow, Hugging Face, MXNet, LangChain, LlamaIndex, Jax, Keras, Pandas, Flask, Django, AWS, Docker, PowerBI |
| **Databases:** | MongoDB, Redis, PostgreSQL |
| **Relevant Coursework:** | Deep Learning, Advanced Probability and Statistics, Probabilistic Graphical Models, Optimization Theory, Numerical Methods, Advanced Robot Dynamics |

## SELECT RESEARCH EXPERIENCE [SEE GOOGLE SCHOLAR FOR ALL PUBLICATIONS]

**Raytheon Technologies**                                                   *August 2023 - December 2023*

- Discovered causal and symbolic structures from particle and mesh-based physics simulations using Large Language Models and Graph Diffusion Models. Achieved average RMSE reduction of 45%, outperforming existing state-of-the-art Graph Networks.
- Developed a physics-based knowledge graph and implemented an innovative Retrieval-Augmented Generation (RAG) system to dynamically query the knowledge graph, enabling precise, task-dependent answers to complex physics questions.

**Rolls-Royce Company**                                                     *January 2022 - January 2024*
**Air Force Office of Scientific Research**                                  *August 2018 - January 2021*

- Utilized Graph Neural Networks and Probabilistic Graphical Models to learn generalizable physics simulators and accelerate computing simulations. Achieved an average RMSE reduction of 40% across SOTA one-step/multi-step learnable physics models.
- Developed graph representation learning techniques to enhance accuracy in node classification and link prediction tasks. Conducted extensive testing across graph sizes ranging from 2,000 to 2.5 million nodes, revealing a notable 2-4% enhancement in node classification performance compared to SOTA, even in scenarios without node features.