

Karthik Subramaniam

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Education

Carnegie Mellon University

Pittsburgh, PA

Master of Science in Mechanical Engineering – Research

May 2025

Relevant Courses – Additive Manufacturing, Computational Fluid Dynamics, On-Device Machine Learning

Birla Institute of Technology and Science, Pilani – Pilani Campus

Pilani, India

Bachelor of Engineering in Mechanical Engineering

May 2023

Relevant Courses – Advanced Finite Element Modelling and Analysis, Gas Dynamics, Computer Aided Design

Skills

Engineering Software – LS-Dyna, Ansys, Spaceclaim, NX, Solidworks, Fusion360, AutoCAD, ABAQUS, Minitab

Programming Languages – Python, C, C++, MATLAB, Simulink, Java, HTML, CSS

Engineering – Mechanical Design, FEA, CFD, Modal Analysis, Vibrations, metallography

Machine Learning – Deep Neural Networks, Reinforcement Learning, Model Pruning, Transformers, Diffusion

Work Experience

Carnegie Mellon University

Pittsburgh, PA

Course Assistant – Additive Manufacturing

August 2024 – Present

ASML

San Jose, CA

Mechanical Engineering Intern

May 2024 – August 2024

- Wrote technical documentation for design and analysis of packaging assemblies for optical machine components
- Redesigned the packaging of the electron beam source on NX to be 80% safer and 15% more reliable in transport
- Analyzed issues with electromagnetic wafer clamping using Ansys to reduce machine servicing time by 30 minutes

ARCI Hyderabad - SLM Additive Manufacturing lab

Hyderabad, India

Project Intern

August 2022 – December 2022

- Operated the Selective Laser Melting Machine (AM) and designed experiments for tensile and microstructure testing
- Experimented with process parameters statistically to optimize porosity by 4% and surface roughness by 23%.
- Reduced energy expenditure calculated by anova for post processing heat treatment of SS 316L by 40%

JSW Steel - R&D Division

Vijayanagar, India

Summer Intern

June 2021 – July 2021

- Developed a model to automate performing tensile test simulations on ABAQUS, verified with real tensile test data
- Reduced the number of real tests, saving on material and machining cost and 10 man-hours per month

Projects

Carnegie Mellon University

Pittsburgh, PA

Modelling movement of micro-swimmer robot (Professor Taylor)

September 2023 – Present

- Collaborating with Engineers from Ansys to push the capabilities of LS-Dyna's applications in biomaterials
- Developing novel methods to solve Fluid-Structure Interactions with DNA structures, a plastic-like material
- Optimizing the drag factors of different micro-swimmers to improve efficiency and speed of locomotion

Reinforcement Learning for time-series forecasting

January 2024 – May 2024

- Created RLFinNet, a reinforcement learning-based model tailored to forecast financial time-series data
- Achieved an accuracy of 2.1% better than state-of-the-art with a training time of 110 seconds on Nvidia's Tesla T4

Modelling inert gas flow in an Additive Manufacturing Chamber

September 2023 – December 2023

- Wrote Python script to solve Navier Stokes and model inert gas flow in an Additive Manufacturing chamber
- Designed experiments and evaluation metrics to determine best gas inlet-outlet positions employing Taguchi Method

BITS Pilani

Pilani, India

Finite Element Analysis of functionally-graded cylinder

February 2023 – April 2023

- Solved Timoshenko beam equations to show strain-displacement relations of shelled functionally-graded elements
- Developed MATLAB script for Finite Element and Finite Difference Method modelling that can be used off the shelf

Leadership

Technical Director, CMU C#

May 2024 – Present

President, Music Club BITS Pilani

January 2022 – May 2023