

# Vishakh Menon

ML/Robotics-focused CSE student with research in physics-aware machine learning; strong math and systems foundations.

 menonvr@uci.edu

 949 656 9249

 Irvine, CA

 linkedin.com/in/vishakhm

## EXPERIENCE

### Electrical Engineering and Computer Science (EECS) Dept. – UC Irvine

Undergraduate Researcher (Optical-Physics Aware ML)

July 2025 – Present

- Conducting independent research under Prof. Fei Xia on physics-aware neural networks, modeling real-world hardware constraints (drift, noise, quantization) via a config-driven PyTorch pipeline.
- Designing modular PyTorch framework with constraint injections, enabling rapid sweeps via TOML configs and auto-logging of metrics/artifacts, aiming for conference proceedings submission.

Undergraduate Researcher (Optical Neural Networks)

June 2025 – Present

- Researching in Prof. Maxim Shcherbakov's lab under the guidance of himself and PhD student Arturo Ramirez, to build a free-space diffractive optical neural network.
- Supporting research on free-space diffractive, Fourier-transformed optical neural networks through simulation of physics with PyTorch-based implementations.

### Kumon – Irvine, CA

Mathematics and Reading Instructor

May 2024 – Dec 2025

- Provided individualized math and reading support to 15+ students a day, ranging from early learners to high school level with a special emphasis in advanced students.
- Explained mathematical concepts, ranging from algebra to college-level calculus, clearly and adaptively, reinforcing critical thinking and problem-solving strategies.

## EDUCATION

### University of California, Irvine

Bachelors of Science in Computer Science and Engineering, Honors - 3.5 GPA

Sept 2024 – Present

Graduate Coursework: Machine Learning for Signal Processing, Unsupervised Learning, Reinforcement Learning, Model and Control of Dynamic Systems

Undergraduate Coursework: Embedded Systems, Algorithm Design and Analysis, Artificial Intelligence

### Irvine Valley College

Associates of Science in Mathematics, Physics - 3.7 GPA

Aug 2022 – May 2024

## PROJECT

### Multi-Task Autonomous Driving Model with Optical-Flow FoE Prediction

- Developed a multi-head ConvLSTM network for autonomous vehicle motion prediction, achieving 94.7% validation accuracy in classifying discrete driving maneuvers (Stop, Straight, Turn).
- Implemented a sensor fusion pipeline using 2,700+ KITTI dataset frames, integrating Optical Flow and Focus of Expansion to reduce velocity prediction error to 0.26 RMSE.
- Designed a multi-task learning architecture to simultaneously predict continuous control signals (velocity/yaw), discrete primitives, and visual focus of expansion with high fidelity.

### Optics-Aware Neural Network with Physical Constraints

- Built a config-driven PyTorch experimentation framework (TOML) for repeatable sweeps, metric logging, and artifact saving; ran 216-run ablation study across MNIST/Fashion-MNIST/CIFAR-10.
- Implemented noise/quantization/drift injection modules for Conv/Linear layers via hooks; used results to analyze robustness under hardware constraints.

## SKILLS

- Python, C++, C, PyTorch, NumPy, Scikit-learn, SciPy, OpenCV, Git, Linux, ROS2, Gymnasium