# Tim Sananikone

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## Education

**University of California, Irvine**, BS in Computer Science
- GPA: 3.74
- **Relevant Coursework:** Project in Computer Vision, Neural Networks and Deep Learning, Machine Learning and Data-Mining, Artificial Intelligence, Data Structures and Algorithms

## Experience

**Machine Learning Intern**, Monterey Bay Aquarium Research Institute (MBARI) – Moss Landing, CA
- Independently led a kelp coverage calculation project collaborating with senior researchers
- Spearheaded the creation of a ground truth dataset to establish a benchmark for new detection methods
- Presented project progress and technical decisions regularly to mentors

**Undergraduate Researcher**, Molloi Lab – Irvine, CA
- Designed and implemented a 3D U-Net model for airway segmentation, securing funding as a UROP Fellow
- Developed a digital CT phantom generation pipeline using open-source code, producing over 50 phantoms for multi-material decomposition research
- Increased iodine map clarity in CT scans by 20% by integrating digital phantoms, contributing to an abstract accepted for the 2025 AAPM Annual Meeting
- Added functionality to convert .RAW files to DICOM, improving compatibility within lab workflows

## Skills

**Programming Languages:** Python, C++, C, Assembly, HTML/CSS, MATLAB, JAVA
**Technical Skills:** Large Language Models, ML-Based Segmentation, Data Structures / Algorithms, Systems Design, Microcontroller Programming, Parallel Programming

## Projects

**Kelp Coverage Pipeline (MBARI Internship)** [GitHub]
- Built an end-to-end pipeline to estimate kelp canopy size from UAV images
- Integrated Segment Anything Model (SAM) and Slicing-Aided Hyper Inference (SAHI) for scalable object detection and segmentation
- Utilized GPU acceleration to process over 26,000 images, preparing the pipeline for future benchmarking against a curated ground truth dataset

**NeRF Model for 3D Reconstruction** [GitHub]
- Implemented a Neural Radiance Fields (NeRF) model from scratch
- Achieved a Mean Squared Error (MSE) loss of 0.0018 with a dual-network architecture (coarse and fine sampling)
- Optimized model performance through volume rendering and hierarchical sampling techniques

**3D U-Net Model for Airway Segmentation (UROP)** [GitHub]
- Developed a 3D U-Net architecture in PyTorch to automatically segment airways from CT scan volumes
- Achieved a Dice coefficient of 0.94 on a training set of only 25 CT scan volumes
- Implemented a custom data augmentation pipeline (random rotations, flips, elastic deformations) to improve model generalization
- Designed a modular preprocessing workflow for windowing and patch extraction

**Light-Sensing Plant Robot** [GitHub]
- Built an autonomous light-seeking robot using an ESP32 microcontroller programmed in C++
- Implemented a threshold control algorithm for smooth response based on phototransistor sensor array inputs