ANDY TRAN

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Education

University of California, Irvine (UCI)   Irvine, CA
Bachelor of Science in Electrical Engineering, Spec. in Digital Signal Processing   *Expected June 2027*
− **Honors:** Yardi Scholarship Recipient | **Upper Div GPA:** 3.7

Work & Professional Experience

UCI (Computational Chemistry & Physics Research)   Irvine, CA
Undergraduate Researcher (Under David Clymer)   *May 2025 – Jan 2026*
− Built comprehensive Python simulations to model cardiac ventricle dynamics under neural stimulation, engineering PID-based feedback control loops to regulate and test over 15 distinct biological parameters.
− Modeled MoS_2 nanostructure electrical signaling to analyze hormone-modulated transduction pathways, synthesizing complex datasets to establish baseline constraints for the Deep Learning Modeling Team.
− Optimized simulation stability and enhanced predictive accuracy through rigorous parameter tuning, algorithmic refinement, and iterative system calibration.
− Compiled and analyzed extensive research data using NumPy and SciPy, generating comprehensive time-domain visualizations to effectively communicate theoretical findings and system behaviors.

ZotBins UCI   Irvine, CA
Hardware Engineer (Undergraduate Research)   *Nov 2023 – Nov 2024*
− Performed hands-on assembly, testing, and troubleshooting of prototype multi-sensor systems, integrating ESP32 microcontrollers, optical sensors, and custom 3D-printed CAD enclosures.
− Increased trash vs. recycling classification reliability by 25% (from 60% to 85%) by optimizing end-to-end hardware integration and debugging system routing, data protocols, and power distribution.
− Built and validated functional prototypes enabling real-time object recognition within an IoT-enabled smart bin ecosystem, ensuring sub-200ms processing latency.
− Conducted rigorous failure analysis and hardware-in-the-loop (HIL) testing on embedded components to ensure sustained continuous operation and data integrity across diverse environmental conditions.

Projects

DSP Audio Separation | *STFT, Spectral Masking, Python*   Nov 2025 – Dec 2025
− Achieved a 12dB improvement in Signal-to-Noise Ratio (SNR) for target source separation by designing and implementing a custom STFT/ISTFT pipeline with spectral masking in Python.
− Designed STFT/ISTFT pipeline in Python for time-frequency audio analysis and implemented advanced spectral masking techniques for reliable source separation.
− Visualized spectrograms to analyze frequency-domain behavior, testing audio fidelity and artifact reduction through studio quality speakers to validate DSP algorithms.

WiFi Sensing/RF Imaging | *ESP32, Computer Vision*   Dec 2025 – Feb 2026
− Engineered a coherent 4-node ESP32 multi-antenna array for synchronized WiFi channel sounding, successfully extracting raw Channel State Information (CSI) for RF-based sensing.
− Collected and processed massive spatial signal measurements for RF-based sensing experiments, applying Angle of Arrival (AoA) estimation and the MUSIC algorithm to create visual representations of WiFi signals.

Modeling Judo with ML & Computer Vision | *PyTorch, CNNs*   Present
− Engineered a real-time judo move recognition system operating at 60 FPS with a 63% classification accuracy by building a CNN-based pose detection pipeline to extract and analyze kinematic keypoint data.

Skills

Languages & Tools: Python, C, C++, MATLAB, Git, Linux (Ubuntu/Debian)
Machine Learning & Computer Vision: PyTorch, OpenCV, Convolutional Neural Networks (CNNs), Pose Detection, Object Classification, Edge Detection, Hough Transform, Motion Estimation
Digital Signal Processing: NumPy, SciPy, STFT, DFT/FFT, FIR/IIR Filtering, Convolution, Angle of Arrival (AoA) Estimation, Beamforming, SNR Optimization
Hardware & Embedded: ESP32, Embedded C, Multi-Sensor Integration, PID Control, System Debugging, CAD