ANDREW P. COPELAND

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SUMMARY

Early career mechanical engineer comfortable building rigs, instrumenting experiments (thermistor/RTD, microgravity simulator) and translating results into updated designs; working knowledge of CHT/CFD and thermal FEA.

EDUCATION

M.S., Mechanical Engineering, University of California, San Diego — 2025, GPA: 3.81
B.S., Mechanical Engineering, University of California, San Diego — 2024

SKILLS

CAD & Fabrication:	SolidWorks, Onshape, 3D printing (FDM/SLA), Machining (lathe, mill, basic CAM), Laser cutter, Press brake, Waterjet
Programming & Simulation:	MATLAB (advanced), Python (basic), Git (basic), Intro CFD/CHT workflows (Simscale, Ansys, MATLAB), CoppeliaSim (basic)
Testing & Instrumentation:	DAQ/logging, IMU/GPS integration, PID control, sensor calibration (thermistor, magnetometer), Instron tensile/comp, Rockwell/Vickers hardness, Fatigue and Charpy impact test systems

EXPERIENCE

Research Engineer – UCSD – Mechanical & Aerospace Engineering   *Jul 2023 – Present*

- Developed a two-axis random positioning machine (RPM) for microgravity research to follow a randomized trajectory resulting in an integrated acceleration of <0.01g
- Wrote a randomized trajectory generation algorithm and vector-averaging analysis in MATLAB to simulate and verify experimental results
- Researched and implemented a new brushless-motor powertrain; fabricated custom motor mounts using press-brake and laser-cut components and machined new shaft couplers on lathe and mill
- Designed a modular 3D-printed fixture enabling experiments on plant-virus propagation under microgravity
- Managed a 5-member senior project team to increase working volume by 15x in 2nd-generation RPM

Mechanical Design Intern – UCSD Health, OBGYN Department   *Feb 2024 – Mar 2025*

- Designed novel flexible mechanical pessary and applicator for pelvic organ prolapse treatment incorporating direct feedback from medical professionals (Dr. Ghanshyam Yadav, M.D. and Dr. Charles Nager, M.D.)
- Produced 15+ prototypes designed using SolidWorks and manufactured using Formlabs SLA 3D printing
- Finalized design for IRB clinical trial via silicone injection molding

Undergraduate Research Assistant – UCSD – Mechanical & Aerospace Engineering   *May 2023 - Jun 2024*

- Machined coupler for 9' swing-bucket centrifuge operating as a hypergravity ground analog for launch simulation
- Machined tensile-test dogbone specimens to ASTM E8 standards using waterjet and mill for Instron testing
- Acquired data for virtual engineering lab modules and co-authored 2023 IEEE FIE paper on remote lab access

PROJECT HIGHLIGHTS

- Thermistor Calibration: Built and operated PID-controlled temp bath to calibrate Sea-Bird SBE37; fit Steinhart–Hart and conductivity models via nonlinear least-squares, validated factory coefficients
- Heat dissipation lab: Measured forced/free convection on test coupons; fitted cooling curves to determine convective heat transfer coefficients and Biot number, checking applicability of lumped-capacitance model
- CFD: Built a 2-D compressible Navier–Stokes solver in MATLAB (finite-difference MacCormack) for Ma 4 channel flow with viscous stresses & heat conduction
- CHT: Study of U-tube water-to-air HX; set inlet/outlet BCs, ran mesh-sensitivity, documented fidelity tradeoffs
- Ocean Sensors: Designed and deployed an autonomous 9-axis IMU/GPS buoy off Scripps pier for wave tracking and spectral analysis

RELEVANT COURSEWORK: Thermal Processes, Heat Transfer, Fluid Mechanics, Computational Methods (CFD/FEA), Mechanical Design, Energy Systems and Energy Materials, Robotics, Ocean Sensors and Instruments

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