February 26th, 2024

Dear MBARI Summer Internship Selection Committee,

I am an undergraduate Mechanical Engineering student at UC San Diego graduating in Spring 2025 writing to apply for a Mechanical Design internship in Marine Robotics. After discovering MBARI on Instagram last year, I have realized that MBARI's long history developing ocean research technologies for knowledge and protection of oceans align with my personal values of curiosity, nature, and integrity. I believe my engineering coursework, passion for design, and experiences working with marine robots equip me to help advance Mr. Gene Massion's Coastal Profiling Float project.

At UC San Diego, I learn and build as much as I can. Relevant coursework include Dynamics (A), Solid Mechanics (B), Engineering Design (B+), Computational Methods (A+), Circuits (B+), and I am currently learning the Design of Machine Elements, a course focused on life-cycle design. Notably, last quarter in my Marine Robotics (A) course, I learned how marine vehicles are designed to perform in the harsh ocean environment. In collaboration with peers, I built and custom designed a Buoyancy Glider using SOLIDWORKS and manufacturing techniques of 3D Printing and laser cutting. I performed glider buoyancy & weight calculations, verified results by testing in the water, and implemented a pressure sensor for depth calculations and feedback control. In a marine robotics club, I also designed easily manufacturable parts in SOLIDWORKS for a disposable AUV carrying hydrophones for glacial research in Svalbard, Norway. I accurately conducted weight and buoyancy analysis for the porous 3D-printed AUV using slicing software and used MATLAB to model a silent positively buoyant ascent. Design is fascinating as one considers so many factors - goals, physics, material, geometry, manufacturing, cost, environment, and more - in each part of the machine. It truly is a scientific art.

At the same time, growing up in Long Beach, California, I saw firsthand how oceans and cities are inextricably linked. I spend as much time on the water as I can, teaching seamanship skills to youth as part of Sea Scouting. I have served 70 days of seatime. Unfortunately, while on the water, I witness port pollution, oil spills, DDT pollution all impacting the ecosystem and my community's health. By advancing oceanographic research equipment, we can better discover, survey, and respond to pollution. I want to be part of that mission.

It would be a great privilege to contribute to MBARI's initiatives of advancing marine science and exploration. If you have any questions, please feel free to contact me at (562)-714-4857 or at zadler@ucsd.edu. Thank you for your time and consideration.

Sincerely,
Zackery Adler

Zack Adler

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OBJECTIVE

A Summer 2024 Mechanical Design Internship in Marine Robotics.

EDUCATION

University of California San Diego, La Jolla, CA
B.S., Mechanical Engineering • History Minor • Expected June 2025

Relevant Coursework

Completed:

- Marine Robotics
- Statics & Dynamics
- Solid Mechanics
- Circuits
- Mathematical Physics
- Computational Methods

In Progress:

- Signals & Systems
- Machine Element Design
- Fluid Mechanics

Skills

Proficient in SOLIDWORKS, Autodesk Inventor, MATLAB, Design Thinking, Seamanship.
Knowledgeable in 3D Printing, Laser Cutting, Java, JavaScript, GIT, AWS, Shop Tools.
Currently learning Ansys FEA, Computer Aided Manufacturing & CNC, .

ACADEMIC PROJECTS

Buoyancy Sea Glider, Marine Robotics Course MAE 190, UCSD 9/23-12/23

- Assembled, soldered, and tested low-powered glider with Arduino circuitry.
- Designed and fabricated custom parts in SOLIDWORKS, laser cutting, & 3D Printing.
- Successfully achieved slightly positive buoyancy and stable flight.

Unmanned Aerial Systems, Triton UAS Club, UCSD 9/23-Present

- Designing autonomous parachuting robot deployed from underside of plane wing.
- Constructing aircraft using mold-based fiberglass wet composite layups.
- Optimizing aircraft weight & flight efficiency using computational methods.

AUV for Glacial Research, Yonder Deep Robotics Club, UCSD 9/21–6/23

- Designed AUV parts for up to 50 PSI of pressure in SOLIDWORKS.
- Programmed accurate MATLAB scripts for buoyancy & motion profile analysis.

WORK EXPERIENCE

Boat Camp Counselor (full-time), Long Beach Sea Base**,** Long Beach, CA 6/23-8/23

- Maintained & operated 4 power & sailing vessels safely.
- Engagingly taught engineering & science experiments to 500 elementary students.
- Contributed to record-breaking 20% annual increase in enrollments.

Software Engineering Intern (full-time), Amazon.com, Seattle, WA 6/21-9/21

- Interviewed clients, identified potential features, & proposed design recommendations.
- Programmed & tested new internal admin portal with data visualization, file upload, customer management using AWS Lambda & S3 in React JS & Typescript.
- Slashed time needed for internal processes by 60%.

SEA EXPERIENCE

Sea Scout, Scouts BSA 10/19-Present

- Experienced in Boat Handling, Piloting & Navigation, Electronic Navigation Systems, COLREGS, Small Engine Repair, Deck Seamanship, Ground Tackle.
- Led 72-hour overnight cruises with 15 crew members on 70ft vessel.
- 70 Days of Sea Time.
- California Boater Card Certification.
- Actively Working Towards USCG OUPV Captain's License.

UCSD Sailing Team 10/23-Present

- Competing in small boats sailing in bay & open waters.

AWARDS

Eagle Scout • Sea Scout Quartermaster • Edison STEM Scholar

UNIVERSITY OF CALIFORNIA, SAN DIEGO

UCSD

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SANTA BARBARA • SANTA CRUZ

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11 JAN 2024

SUBJECT: Letter of Recommendation for Zachary Adler

I teach several aerospace engineering and design courses in the Mechanical and Aerospace Engineering Department (MAE) at the University of California San Diego (UCSD). Zachary Adler was a student in an special-topics class that I taught in the fall quarter of 2023. The special-topics course (MAE 190) focused on design of autonomous vehicles for marine applications. Zachary's performance in this course was excellent.

The MAE 190 course includes a hands-on build project that required students to construct and test a small-scale buoyancy glider. Zachary exhibited a deep passion for this project. He frequently came to the project workroom outside of normal lab hours to refine his vehicle. He even followed up with me, after the quarter was completed, with several new ideas on how to modify the baseline glider kit to improve its performance. No other student in the class (of 45 total) responded to my request for ideas.

Zachary Adler has clearly demonstrated a strong interest in marine robotics and physical oceanography. He has already completed several courses offered at Scripps Institution of Oceanography (SIO), including SIO 10 (The Earth) and SIO 139 (Current Research in Marine Biology). These courses are not normally required for the Mechanical Engineering (ME) program, and I know of only a very few ME students who have chosen similar courses as their technical electives.

When compared to other students that I have taught, Zachary's academic achievements are quite noteworthy. He is motivated and genuinely interested in all aspects of ocean engineering. I therefore believe Zachary Adler is an excellent candidate for the MPL Internship Program.

Respectfully,

Mark Anderson
Associate Teaching Professor, UCSD