

Jonathan Siskind

Stanford University

Mechanical Engineering (Dynamic Systems & Controls) and Electrical Engineering

Portfolio: jaysiskind.com ■ 765-412-9156 ■ jsiskind@stanford.edu

Dear MBARI Team,

MBARI's inspiring and groundbreaking work on applying innovative engineering technologies to understand the planet's oceans is a mission I'd be truly honored to be a part of. After visiting MBARI for the summer open house last year and speaking to several MBARI engineers (and many of last year's interns), I knew that it was the exact place I would thrive at. I have 6 years of technical expertise on the mechanical, hardware, and software fronts through both team-based experiences and personal engineering projects (particularly for underwater applications). Furthermore, I have taken a significant amount of relevant coursework at Stanford, including in robotic control theory, ODEs/PDEs, fluid mechanics, thermodynamics, programming abstractions (Python, C++), computer systems, and product design/realization – all of which has resulted in a cumulative 4.0 GPA.

In particular, I am seeking to apply these robotics skills to work in Giancarlo Troni's team on scalable marine robotics – I would love to work on the sensor platforms on these cost-effective robots. Furthermore, I would equally appreciate the opportunity to work with Gene Massion on coastal profiling floats – I can see myself developing embedded electronics/software while also contributing to the mechanical design of equipment aboard these floats.

Team-Based Engineering Experiences:

- I worked as the only undergraduate student in the Stanford Robotics Lab where I worked to design and iterate upon a handheld Raspberry Pi-operated camera for a humanoid underwater diver robot. My most impactful work focused on solving critical issues with underwater lens distortion, correcting underwater roll and spin by adding targeted ballast weights, and adding a camera feed so that operators at the surface could view the camera's livestream.
- At Stanford Space Initiative, I am a team lead for 20 students working on constructing a 600 lb solar-powered rover that will autonomously navigate from the Antarctic coast to the South Pole and back. This rover has GPS waypoint navigation, internet access via Starlink, and a variety of various sensors. On the team, I manage all the students along with operating our \$20,000 annual budget. In addition, I lead problem-solving for our engineering challenges: some of the technical aspects of the rover I have primarily worked on include integrating the solar charging system, enabling RF communication between the rover and the operator control station, and CADing and designing a weatherproof enclosure for the rover's temperature-sensitive electronics.

Individual Engineering Projects:

- I have spent the past three years designing and building a remote-controlled submarine that can dive to a depth of 30 feet, where it can transmit live video via a camera tether to a buoy on the surface. It operates via a motor-driven differential steering system and a custom ballast pump for depth control. I meticulously designed and built every component of the submarine on my own completely from scratch. This submarine is only one of many projects I have pursued; others include an ornithopter drone with flapping wings and a wrist-mounted pyrotechnic device.

I aim to use this same go-getter, innovative mindset to be a valuable asset at MBARI. I pride myself on being a fast hands-on learner, so I can guarantee that I'll be able to do impactful work for MBARI starting on day one. Please do not hesitate to contact me for any more information regarding my qualifications or interest. My values and goals align with those of MBARI, and I hope that our futures will align as well.

Warm Regards,

Jonathan Siskind

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CAREER OBJECTIVE

Self-motivated, passionate, and detail-oriented engineering student with extensive project-based experience in both mechanical and software design seeking to apply hands-on skills and gain expertise in mechatronics, robotics, and automation

EDUCATION

Stanford University

Stanford, CA

Bachelor of Science in Mechanical Engineering

Expected Graduation: June 2026

Minor in Computer Science

GPA: 4.00

Relevant Coursework: ODEs and PDEs, Programming Abstractions (Python, C++), Computer Systems (RISC-V, Bare Metal/Assembly, Git, GDB), Robotic Kinematics/Dynamics/Control Theory, Fluid Mechanics, Thermodynamics, Product Design/Realization

Purdue University

West Lafayette, IN

Non Degree Student (advanced coursework taken during high school)

Relevant Coursework: Multivariate Calculus, ML/Data Science in Python

August 2021–May 2022

WORK & EMPLOYMENT

Stanford Robotics Lab

Stanford, CA

Undergraduate Researcher

January 2023–Present

- Conducted both full and part-time robotics research under the mentorship of Dr. Oussama Khatib as the only undergrad in the lab
- Developed a series of hardware and software upgrades to the handheld camera used by the teleoperated underwater exploration robot Ocean One K. This included the implementation of a tethered ethernet live camera feed to stream Raspberry Pi video to the surface, buoyancy leveling to minimize underwater roll, the integration of an LCD screen inside the camera housing for easier troubleshooting for the user, and correction of underwater lens distortion for sharper and clearer video.
- My equipment was recently tested, utilized, and demoed in an advanced underwater research facility in Dubai

Curious Cardinals

Stanford, CA

K-12 Engineering Mentor

July 2023–Present

- I teach a wide set of fundamental, applied engineering skills including CAD, electronics/circuitry, programming, and more through mentorship to passionate and driven students and help them pursue personally-tailored, hands-on engineering projects

Bricklink

Online

Independent Business

June 2018–September 2022

- Operated an E-Commerce store for kits/toys: purchased hundreds of toys on clearance and packaged, shipped, and sold them at a markup after they were discontinued by the manufacturer; made approximately \$6,000 profit in the final year of operation
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PROJECT EXPERIENCE

Stanford Space Initiative

Stanford, CA

Polar Rover Team Lead

September 2022–Present

- Lead the Mars division in Stanford Space Initiative; manage the subteam's 40 students and \$20,000 yearly budget
- Currently leading the development of an autonomous, solar-powered, GPS-navigated rover with internet and LiDAR path-planning that will drive across Antarctica to the South Pole
- Evaluated and solved critical hardware issues with the RF transmitter and receiver so that RF and WiFi communication could be established between the human-operated testing interface and the rover's onboard microcontroller; constructed the weatherproof sensor enclosure and solar charging system for 2 early-stage prototype rovers to test navigational and autonomous capabilities

Maker Faire

Various Locations: IN, WI, PA

Independent Engineering Projects

March 2020–Present

- Personally designed and built a fully-functional remote-controlled submarine with differential steering, ballast depth control, and live underwater vision AND a robotic ornithopter with motorized flapping wings and a pan-tilt two-axis tail
 - Demonstrated these projects to hundreds of people at national inventor conventions in Indiana, Pennsylvania, and Wisconsin
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SKILLS & INTERESTS

- Proficiency in Autodesk Fusion 360, Autodesk Inventor, and Onshape CAD software
- Experienced in MATLAB, C, C++, Python, and machine learning libraries
- 6 years of working with Arduino/Raspberry Pi/Mango Pi electronics and circuitry
- 6 years of workshop/power tool skills, 3D printing



STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-9025

OUSSAMA KHATIB
PROFESSOR
DIRECTOR, ROBOTICS LABORATORY
DEPARTMENT OF COMPUTER SCIENCE

Tel. (650)723-9753
Fax. (650)725-1449
khatib@cs.stanford.edu

February 26, 2024

Letter of Recommendation for Jonathan Siskind

Dear Colleagues,

I am pleased to write this letter in support of the application of Jonathan Siskind to the MBARI Summer Internship program. I have known Jonathan for more than a year. In the Spring and Summer quarters of 2023 he worked in my lab on a paid research internship as part of Stanford's CURIS program. Currently, he is taking my graduate-level Introduction to Robotics class, where he is easily matching or exceeding the marks of his graduate student and upperclassmen peers. Jonathan is a bright student who approaches novel challenges with a creative eye and a careful attention to detail.

The first thing that stood out to me about Jonathan was his passion for underwater robotics. At the beginning of 2023, he reached out to me looking to get involved with one of our lab's most unique projects, the humanoid underwater diving robot OceanOneK. The photos he included of his own underwater ROV gave me a good idea of just how serious he was about this interest, so we arranged to have him work on some tools that the robot would use in an upcoming diving trip. His most significant contribution was on a custom-built handheld underwater camera designed to match the robot's operating depth of 1000 meters. On our previous expeditions this tool was used to see into enclosed areas of shipwrecks that the robot itself could not get into.

Jonathan successfully used his wide range of mechanical, electrical and software engineering expertise to upgrade the whole system on multiple fronts. He re-wired the internal electronics and reprogrammed the camera's microcontroller to support a better display and more reliable user interface, fixed an outstanding issue with lens focus underwater, modified the enclosure to improve on the whole system's buoyancy, and created an additional underwater cable system that connects directly

to the robot for live-streaming video from the camera tool. In doing so he dramatically improved the ease of use and functionality of our tool and we were very pleased with its performance in our dive later that year.

Throughout his internship with us, Jonathan also proved to be a friendly, helpful and reliable member of our lab. He worked well with my team of graduate students, provided regular progress updates throughout the internship, and made sure that all of his modifications were well documented for future reference. He was also quite proactive about seeking out assistance from experts in the field when he encountered problems that were previously unknown to him, as in the case of the lens focusing issue.

I can tell that Jonathan will continue to pursue his passion and excel wherever it takes him. Towards the end of our summer, he attended the 2023 MBARI open house and came back to us inspired and excited by your work, so I know that this is another opportunity that he has been looking forward to for quite some time. I believe he would be a strong candidate for either the Autonomous Coastal Profiling Float position or the Scalable Marine Robotics position. Given his previous work on all aspects of our underwater camera tool, he should be well equipped with all the skills necessary to work on software, testing, and mechanical design for the floating coastal monitoring system. On the Scalable Marine Robotics side, we actually did discuss many of the same ideas around sensor calibration and SLAM towards the end of his internship, as these are systems we are looking to improve on in our own robot. I am fully confident that, with his motivation and ability, Jonathan will make significant contributions to the underwater robotics field as he seeks to bring robotics solutions to solving real-world problems. .

Sincerely,

A handwritten signature in black ink, appearing to read "Ouassama Khatib". The signature is stylized, with the first name "Ouassama" written in a cursive-like script and the last name "Khatib" in a more formal, blocky style.

Ouassama Khatib
Professor