

Matthew Barrs
(850) 525-9947
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3470 Tibet Drive
Gulf Breeze, FL 32563

February 26, 2024

To whom it may concern,

I am a first year mechanical engineering student at the University of Central Florida looking to enter the field of underwater robotics. When I recently attended the Ocean Sciences Meeting, I got to see the research being done across the world using underwater robotics from mapping sea currents to analyzing population trends on reefs. You can imagine how thrilled I was when I heard about the internship opportunities at the MBARI table. MBARI's commitment to advancing oceanographic research through innovation and collaboration is inspiring.

My interest in underwater robotics began in high school with the SeaPerch competition. Using 3D printed parts taught me how to design around your manufacturing constraints. As an engineer, I take a holistic approach to design. I know how crucial it is for software, hardware, and manufacturing to be meshed together. This is why I believe it is important to have an understanding of each component. I actively work to broaden my skillsets beyond my mechanical engineering courses. For example, I have worked closely with the programming team on the unmanned electric boat I am helping to build this semester to gain more experience in programming microcontrollers. I hope to be able to take this mindset into my future career in underwater robotics.

I believe this mindset would also benefit me greatly at MBARI where new technologies are being developed. I would be most eager to work with Gene Massion on autonomous coast profiling floats. I am particularly impressed by the adaptability of this float design. Learning about the ability to find currents at different depths for the float to be able to position itself is the perfect example of meshing hardware with software. My mechanical engineering background coupled with my hands on experiences in programming, electronics, and manufacturing has equipped me with the skills and analytical mindset to make contributions to this project.

I am confident that my skills and enthusiasm make me a strong candidate for this opportunity. Thank you for your consideration and I look forward to hearing back and possibly working with MBARI this year.

Sincerely,
Matthew Barrs

Matthew Barrs

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Permanent Address: 3470 Tibet Drive, Gulf Breeze, FL

Education

University of Central Florida, Burnett Honors College – Orlando, FL **August 2023 – May 2027**

Bachelor of Science in Mechanical Engineering, Minors in Intelligent Robotic Systems and Biology

Overall GPA: 3.96/4.0

Navarre Beach Marine Science Station – Navarre, FL

August 2022 – May 2023

Intro to Marine Biology and Oceanography

Projects

Promoting Electric Propulsion Competition **Spring 2024**

- Working with a multidisciplinary team to develop an unmanned boat utilizing electric propulsion to complete a five mile course
- Using SolidWorks and Fusion360 to design the boat and components
- Utilizing C to program an ESP32 microcontroller to control the boat and collect data from GPS and sensors

Innovative Additive Manufacturing 3D Challenge

Fall 2023 – Spring 2024

- Utilizing SolidWorks to create detailed 3D models of the drone and to optimize the design for structural integrity, modularity, and the 3D printing process
- Using an Arduino microcontroller to control driving functionality of the drone

SeaPerch ROV Team

Spring 2023

- Designed and built a remotely operated vehicle to compete in an obstacle course and simulate real world applications of ROVs such as moving objects and ocean floor mapping
- Designed 3D printed motor mounts for better construction tolerances than other mounting techniques
- Placed 10th in the international competition

NBMSS Aquatic Care Team

Fall 2022 – Spring 2024

- Gathered estuarine water quality data in the Santa Rosa Sound to identify patterns in parameters
- Collected samples for red tide analysis with the HABscope system
- Utilized funding from the NOAA grant “Empowering Students to Take Action: Aquatic Care Team”

Organizations

Gulf of Mexico Coastal Ocean Observing System – Outreach and Education Council

January 2024 –

- Act as the youngest member on the team, offering a new perspective on the ever-changing needs of outreach
- Provide input on the development of educational materials and programs tailored to regional needs

Marine Biology Education and Awareness Club – Education and Outreach Coordinator

Spring 2024

- Work with the other officers to promote involvement in the club by planning meetings and other activities
- Lead tabling and other academic events to allow members to share their marine science knowledge

Clubs & Societies: American Society of Mechanical Engineers, Robotics Club of Central Florida, Next Gen Engineering, UCF SCUBA Club, Marine Biology Education and Awareness Club

Skills

Software: SolidWorks, C, Python

Hardware: 3D Printing, Soldering, Electronics Assembly, Arduino

Work Experience

Destin-Fort Walton Beach – Okaloosa County, FL

March 2023 – August 2023 (Seasonal)

Little Adventures Beach Scout

- Recruited participants for daily pop-up experiences and assisted in the registration process to facilitate engagement
- Assisted teaching classes on outdoor skill such as fishing, surfing, and marine biology
- Collected local marine life specimens for use in classes
- Communicated with class experts to plan for any potential severe weather or other program issues

Certifications

Professional Association of Diving Instructors

- Advanced Open Water Diver
- AWARE Shark Conservation Diver
- Enriched Air Diver
- Dive Against Debris Diver

Dassault Systèmes

- Certified SolidWorks Associate



Navarre Beach Marine Science Station

Santa Rosa County School District
8638 Blue Heron Court
Navarre Beach, FL 32566

February 26, 2024

To whom it may concern,

It is with immense pleasure that I write this letter of recommendation on behalf of Matthew Barrs as he applies for the internship at the Monterey Bay Aquarium Research Institute.

Although I have only known him for two years, I am confident in saying *Matthew is one of the most well rounded, intelligent, and creative students I have taught in my 25 years in education.* He was enrolled in my OCB2000 Marine Biology and OCE1000 Oceanography classes at the Navarre Beach Marine Science Station. Even though he is no longer my student, I provide him with opportunities because he is truly one-of-a-kind. As a mechanical engineer majoring at UCF, he would benefit from the experience of working alongside MBARI scientists. This bright young man is enthusiastic, talented, intuitive, and focused on his education.

How is Matthew different than the other applicants? Matthew is an outstanding science communicator. As we already know, science is not finished until it is communicated. A key challenge in any research is making abstract concepts relevant to people. Many scientists struggle to communicate their research clearly and logically to others. Having served as an educational consultant on grants, I provide input on how researchers can effectively communicate their findings to a broader audience. Matthew is already a better communicator than most research scientists. In addition to his intellect, Matthew has a way of making science concepts understandable for people of all ages. His creativity and teaching techniques help others understand challenging concepts such as ocean acidification, the physics behind ROVs, and even the importance of water quality. Matthew's effective communication techniques are among the most important skills for future scientists; they enable better understanding, collaborating, decision making, and teaching.

Matthew's stellar communication skills were utilized as part of our National Oceanographic and Atmospheric Administration (NOAA) grant titled "*Empowering Students to Take Action: Aquatic Care Team.*" His ability to communicate science and proficiency with water quality sampling methods is impressive in that he teaches me.

Matthew is a bright and *humble* student, one who was an established leader at Gulf Breeze High School, and the Navarre Beach Marine Science Station. He possesses the personal attributes and dedication to the community that sets him above others. He is an invaluable part of our learning environment as his achievement is only matched by his high intellect, maturity, and engaging personality. As part of my program, he taught school groups and participated in beach clean ups, dune restoration, water quality monitoring, and our Autism OdysSea event. In addition, his SeaPerch ROV team placed 10th at Nationals.

He has a natural ability to learn tough scientific concepts and to communicate his knowledge clearly and concisely. Matthew has earned the respect and admiration of the administration, faculty, and peers with his commitment to excellence. He has left an impression on me, and I miss his leadership and positive presence in my class. He has the utmost integrity and above all an enormous potential to continue his success in the science field. Matthew is a delight to teach, and I feel privileged to be part of his education. He is an excellent example of a future leader in ocean engineering.
Sincerely,

A handwritten signature in cursive script that reads "Charlene Mauro".

Charlene Mauro
Director, Navarre Beach Marine Science Station
Adjunct Professor, Pensacola State College
Science Specialist, Santa Rosa County School District
(850) 449-4295