

Mageean Brown

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EDUCATION

California Institute of Technology, M.S. in Aeronautics

Sept 2024 – June 2025

Graduate Aerospace Laboratories (GALCIT). Pasadena, CA. GPA: 3.9/4.0

- Track in Fluid Dynamics and Control Systems

Brown University, B.S. with Honors in Mechanical Engineering

Jan 2021 – May 2024

School of Engineering. Providence, RI. GPA: 3.9/4.0

- Honors thesis: “Exploring the Role of the Appendage Cupping Angle on the Swimming Performance of Shrimp Through a Bio-Inspired Model”

PROJECTS

Please see my website for a full project portfolio: <https://mageeanbrown.github.io/>

Brown Formula Racing

- Led design and fabrication of the chassis (2024) and steering system (2023) for student-built race cars. Both cars completed all events at the FSAE Michigan international competition.
- Taught welding and design skills by guiding 5 new members through an intro manufacturing project and held weekly welding hours to help members practice tungsten inert gas (TIG) welding.
- Validated chassis designs by using finite element analysis (FEA) in Solidworks and applying physical tests on the chassis for determining torsional stiffness.
- Took a 6-week machining course and subsequently accumulated hundreds of hours of machining experience using lathes and mills (manual and CNC).

Bicycle Framebuilding

- Independently designed, validated (Solidworks FEA), and fabricated a custom steel bicycle frame from scratch.
- Used manual and CNC machines to fabricate an adjustable welding jig from aluminum. This took about 2-weeks of full time machining, and most tolerances were within 0.002”.
- Coped steel tubes together using mills and hand files. This involved working with bicycle tubing with bends and non-circular cross-sections and cutting these tubes at compound angles.
- Welded the bike frame using tungsten inert gas (TIG) welding. Small frame components (cable guides, bottle bosses, etc.) were attached with oxy-acetylene brazing.

RESEARCH

Dabiri Lab

Caltech

Graduate Researcher

June 2025 – Present

- Studying vortex interactions between tandem bio-hybrid (robotically-controlled) jellyfish to be used for ocean exploration and monitoring.
- Design and program circuitry for jellyfish swimming control using Arduino, and rapidly prototype electronics housings to withstand salty and high-pressure ocean environments, primarily using SLA 3D printing

Wilhelmus Lab

Brown University

Undergraduate Researcher

Feb 2023 – Aug 2024

- Applied knowledge of fluid mechanics to study shrimp transport for the development of bio-inspired autonomous underwater vehicles (AUVs).
- Designed and built modular robotic shrimp swimming appendages (pleopods) that accurately simulated metachronal swimming based on biological studies of shrimp kinematics using MATLAB and Arduino.
- Studied the effects of pleopod geometry on swimming performance using 3 different experimental techniques: particle image velocimetry (PIV), force measurement, and kinematic tracking in MATLAB.

Witman Lab
Undergraduate Researcher

Brown University
Sept 2021 – Jan 2024

- Processed over 1000 hours of underwater acoustic data using Triton software in MATLAB to determine the impact of anthropogenic activity on marine ecosystems in the Galápagos Islands.
- Helped organize outreach events to share marine ecology research with younger students and improve the accessibility of marine science to the general public. Projects include a month-long Marine Ecology Research Exhibition at the Granoff Center for the Creative Arts.

PUBLICATIONS

- Oliveira Santos, S., **Brown, M.**, Kim, M., Tack, N., Wilhelmus, MM. Force generation in a bio-inspired rotating and pitching plate of variable area. *Under final preparations; Manuscript available upon request.*

Conference Proceedings:

- **Brown, M.**, Oliveira Santos, S., Tack, N., Wilhelmus, MM. Analysis of Shrimp Appendage Cupping on Swimming Performance through a Bio-inspired Model. (Oral Presenter) APS 76th Annual Meeting of the Division of Fluid Dynamics, Washington D.C.
- **Brown, M.**, Oliveira Santos, S., Tack, N., Wilhelmus, MM. Appendage cupping and hydrodynamics of shrimp-inspired model. (Poster Presenter) 2023 Summer Research Symposium, August 4th, Providence, RI

JOBS AND INTERNSHIPS

The Wheeler School
Computer Aided Design Teacher

Providence, RI
March 2023 – May 2024

- Developed an introductory course in computer aided design (CAD) entirely from scratch using Onshape.
- Prepared and taught weekly classes to middle-school students, organized projects, and incorporated hands-on activities, such as lessons using 3D-printers.

NuWatt Energy
Project Manager Intern

Woburn, MA
Jan 2022–April 2022

- Moved solar projects from start to finish by filling out permits and working with third parties to organize project logistics.
- Used Zoho CRM system to manage communication between the company's solar installers and the client.
- Updated the company website with relevant technical information about solar installations for potential clients.

HONORS AND AWARDS

- **NSF GRFP Honorable Mention** (National Science Foundation) *Spring 2025*
- **Domenico A. Ionata '26 Award** (Brown University) *Spring 2024*
- **Undergraduate Teaching and Research Award** (Brown University) *Fall 2023*
- **Research at Brown (RAB) Grant** (Brown University) *Fall 2023*
- **APS Travel Grant** (American Physical Society) *Fall 2023*
- **Valedictorian** (Hoosick Falls Central School) *June 2020*

TECHNICAL SKILLS

- **Manufacturing & Design:** 3D printing (FDM and SLA), machining (manual and CNC), TIG welding, soldering, Solidworks, Fusion 360, OnShape
- **Laboratory & Analysis:** Particle image velocimetry (PIV), particle shadow velocimetry, PIV processing in PIVlab and DaVis, dye visualization, force analysis (with transducer and optical methods), ImageJ
- **Programming & Tools:** MATLAB, Python, Microsoft Office, Google Suite