Fleet Robotics @ Greentown Labs
444 Somerville Ave,
Somerville, MA 02143
fleetrobotics.ai

Magnetics & Electrical Co-op

Note: We take year-round co-ops and interns, please specify what term(s) you are available for.

Job Highlights

Fleet Robotics is a Harvard University and VC-incubated green-tech startup developing its first product, an underwater robot to inspect and maintain ship hulls. At Fleet, we are looking for a magnetics and electrical engineer intern to help develop our electrical and magnetic systems, which are all custom-developed for our novel robot and locomotion system that stays on a ship while in motion.

Potential systems under development for this co-op position include:

- High-powered electronics to drive magnetic coils
- Sensing systems to measure paint thickness
- Ultrasonic sensors to detect obstacles
- Wireless charging and battery management
- Optimization of a robot with 8+ degrees of freedom
- Underwater localization systems involving acoustics

This role offers the ability to make significant contributions to a novel and meaningful environmental application by working with a small, close-knit, and fast-paced team.

Primary Responsibilities

- Design electrical circuitry to address the various needs of the robot in Altium Designer
- Use automated test fixtures to iterate on magnetic coil excitation to produce optimal driver circuitry with the lowest power consumption
- Design custom magnetics for robot adhesion systems
- Develop new sensing systems and test the robot in real-world conditions
- Work with the firmware team to implement new sensing systems after proven
- Develop battery management and charging systems, design test fixtures, and implement into production robotic system

Required Skills

- Currently enrolled in a 4-year university program of a related discipline and available for a 4-6 month internship or co-op
- Experience or interest in magnetic systems
- Comfortable designing electronic circuits, using Altium Designer or similar. The ability to do PCB layout is a plus, but not required (we will teach you!).
- Comfortable programming skills in one or more: C/C++, Python

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- Confidence in problem-solving skills
- Good teamwork, communication, and interpersonal skills
- Ability to work independently and within complementary teams

Everyone's background is different. We are committed to fostering an environment with diverse experiences, ideas, and backgrounds. Diversity includes not only race and gender identity, but also sexual orientation, religion, and disability status. We are deliberate and self-reflective about the kind of team culture that we are building, seeking engineers who are not only strong in their own aptitudes but who care deeply about supporting each other's growth. If you are excited by the ability to develop novel robots and solve challenges, then we encourage you to apply.

Meaningful Work

We are tackling a thousand-year-old problem: the growth of biofouling on ships. Biofouling is the growth of microorganisms, algae, barnacles, and larger ocean organisms on the ship's hull. As the ship delivers our goods around the world, the growth of these organisms significantly increases the drag forces on the ship and in doing so, significantly increases fuel consumption. Ships are the world's largest consumers of carbon-heavy fuels (called bunker fuels). A covering of biofouling just half a millimeter thick can increase emissions up to 30%, which translates to multiple tons of bunker fuel per day, per ship[1].

Conventionally, the commercial shipping industry handles biofouling in two ways: preventatively, by coating the ship's hull in a highly toxic paint that discourages growth, and reactively, by stopping operations every 6-months or so to have divers scrape off years of fouling that grows anyway (not to mention scraping off the toxic paint). We think this is akin to deciding never to brush your teeth because you go to the dentist every five years. There is a better way.

Our small autonomous swarm of robots lives on the side of the ship hull for years, gently removing the earliest stage of biofouling on a weekly basis. This early-stage biofouling is easy-to-remove slime. The technical challenge lies in having a robot that can withstand the harsh environments of adhering to the ship hull while the ship is underway, underwater, anywhere in the world - totally autonomously. By removing slime often and early, we prevent the growth of macrofouling, significantly reduce fuel consumption, and prevent the spread of invasive species from port to port. Eventually, we aim for our robots to eliminate the need for toxic anti-fouling paints entirely.

Apply

Email resume to Dr. Michael Bell: jobs@fleetrobotics.ai

[1] http://www.glofouling.imo.org/_files/ugd/34a7be_02bd986766d44728b85228c3ec9b95ee.pdf

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About Fleet Robotics

Fleet Robotics grew out of the Harvard Microrobotics lab, incubated by Material Impact[2] and Harvard University. We have a core team of roboticists who have designed robots for use in underwater inspection and navigation, and who were the world's first to deploy tracking tags to sperm whales with autonomous drones[3]. We are a passionate team that cares deeply about solving significant environmental and ocean-based problems with cutting-edge robotics.

[2] https://www.materialimpact.com
[3] https://www.projectceti.org