Firmware Engineer Co-op/Internship

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 an extraordinary roboticist to spearhead the development of novel path-planning algorithms that are robust to the dynamic and unpredictable environments present on ship hulls. Challenges include dealing with harsh and irregular environmental conditions, utilizing limited or varying sensor data, and lack of communication and near-zero visibility while underwater. The ideal candidate will be interested in contributing new firmware and embedded system features and functionalities. This role offers the ability to make significant contributions to a novel and meaningful environmental application working with a small, close-knit, and fast-paced team.

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

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Primary Responsibilities
- Design and implement bare metal firmware for microcontrollers
- Expand firmware functionality for an existing communication system
- Develop embedded drivers for sensors, actuators and peripheral devices
- Add features to unit testing and hardware in the loop testing fixtures
- Debug and troubleshoot complex software systems
- Work collaboratively with the electrical, mechanical and path planning software teams to bring up new hardware and software

Requirements

- Currently enrolled in a 4-year university program of a related discipline and available for a 4-6 month internship or co-op
- Strong programming skills in C/C++ or Python
- Familiarity with Git software version control
- Familiarity with the Linux operating system
- Experience with standard communication protocols (SPI, I2C, CAN, UART, USB, BLE, WiFi)
- Basic knowledge of software development lifecycles, software debugging practices, revision control, bug tracking, and documentation
- Confidence in problem-solving skills
- Good teamwork, communication and interpersonal skills
- Ability to work independently and within complementary teams

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.

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

Apply

Email resume to Kelly Ostrom, Sr. Firmware and Sensing Engineer: jobs@fleetrobotics.ai

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.

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