

## Applied Robotics for Marine Sustainability



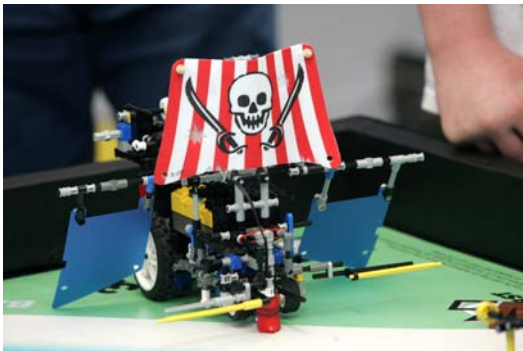
Empirical observations indicate that a large amount of trash exists near human pathways. Similar to the banks of a highway, aquatic debris exists along bodies of water near human populations.

A challenge waiting to be solved is the development of a cost-effective solution to recovering this debris.

Most technologies developed for working underwater target high value applications, such as petroleum exploration and development, research, and construction. These vessels are designed for harsh and extreme environments and not suited for debris recovery.



Other technologies are limited to surface skimming of visible debris.



In 2005 The **FIRST LEGO® League** (FLL) introduced Ocean Odyssey, a competition that gave 9 to 14 year old students a chance to 'solve' problems related to the marine environment.

Students learned about species sampling, pollution cleanup and other issues regarding sea life.

The students that participated in Ocean Odyssey are now competing in the **FIRST Robotics Competition** (FRC).

Here they apply problem based learning methods to build machines from industrial grade components to solve a variety of engineering challenges. These teams engage in annual engineering competitions.



When not engaged in competition, the Kell Robotics team spends time applying their skill and knowledge toward developing a low cost practical solution to marine pollution.

This effort doubles as an educational outreach program to spur interest in STEM education.



## **Elementary & Middle School Robotics Education**

The **FIRST LEGO® League** (FLL) introduces children, ages 9 to 14, to the fun and excitement of solving real-world problems by applying math, science, and technology.

FLL engages teams in authentic scientific research and hands-on robotics design using LEGO MINDSTORMS® technologies and LEGO bricks.

Teams compete in a friendly, FIRST-style, robotics event specially designed for their age group.

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## **Middle & High School Robotics Education**

The **FIRST Tech Challenge** (FTC) offers high school and middle school students the traditional challenge of a FIRST competition, but with a more accessible and affordable robotics kit.

Design, build and program robots using the FTC Robotics System.  
Apply real-world math and science concepts.  
Develop problem-solving, and team-building skills.  
Compete and cooperate in alliances at tournaments.

Qualify for \$10 million in scholarship funds.

FTC makes it easy and fun to explore robotics concepts.



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## **High School Robotics Education**

The **FIRST Robotics Competition** (FRC) combines the excitement of sports with science and technology to create a unique varsity sport for the mind.

FRC helps high school students discover the rewarding and engaging process of innovation and engineering.

Students can:

- Play with the Pros - work with professional engineers.
- Design, build and program robots.
- Earn a spot at the Championship.
- Qualify for \$10 million in scholarship funds.

FRC is a fascinating, real-world, professional experience and helps students see the value of education and careers in science, technology, engineering and math.

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**To Learn More or Get Started Visit [www.gafirst.org](http://www.gafirst.org)**

To learn more about GaDOE's participation in FIRST, contact Ron Barker at GaDOE