Enhancing the Narragansett Bay Observatory with Unmanned Underwater Vehicles (UUVs)

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Project Location:
University of Rhode Island-Bay Campus

Project Description:
The project is to enhance the Narragansett Bay Observatory with unmanned underwater vehicles (UUVs). The goal is to collect high resolution spatial and temporal hydrographic measurements between existing surface buoys. Hence, we could advance the understanding and modeling of the biological-chemical-physical relationship in the bay. The prospective candidate will be trained to operate a portable UUV, and will conduct UUV deployments on the water.
There are two options for research focuses.

1) For "data" focused option, the student will
   a. work on developing a toolkit (API) for data processing, analysis, and visualization
   b. work with other scientists and students quantify the modeling improvement of having the UUV data
   c. work with other members in the lab on new bio-chemical sensors integration for UUV.

2) For "engineering" focused option, the student will
   a. explore acoustic-based navigation or terrain-based navigation for the UUV
   b. validate and characterize sensor performance, e.g., accuracy and uncertainty, in labs or field experiments
   c. implement the navigation algorithm on the UUV, and test it in the open water.

*This project involves **primarily field work***

Required/preferred skills for student applicant:
1) For the "data" focused option, the student is expected
   a. familiar with the MATLAB tools or other equivalent programming software, e.g., Python, Scilab,
   b. having the fundamental knowledge of oceanography,
   c. willing to work on the water,
   d. excellent writing skills for generating documents and manuals.

2) For the "engineering" focused option, the student is expected
   a. familiar with c++ programming language on embedded systems,
   b. having hardware experience in embedded system (Linux OS) or micro-controller (Arduino),
   c. familiar with communication protocols, such as URAT, SPI, or TCP/IP,
   d. having equipment experience in oscilloscope, multi-meters, and soldering,
   e. knowing ROS, MOOS, or have worked on other robotic platforms will be considered as an asset.

Student transportation needed for project?
No