Please provide the following information to be shared with on capstone information exchange platform:

1. **Project number**: Group 13

2. **Project title (as will appear on the poster)**: Adaptive Sampling using an Autonomous Submersible and Crowdsourcing

3. **Team members**: Allen Tung, Anthony Wong, Calvin Li

4. **Adviser(s) name(s)**: Dario Pompili

5. **Up to 10 keywords that will help to classify the project**: Autonomous, Underwater, Adaptive Sampling, Mobile App, Crowdsourcing, Artificial Intelligence

6. **Project abstract (up to 200 words) to be shared with judges**:

Declining water quality has been an issue of global concern throughout the years, affecting both public health and aquatic life. Current water quality infrastructure involves the use of static sensors, “where a tradeoff exists between the area that can be covered by sensors and the sampling density”. Human measurements are prone to inaccuracies, and are costly over time. We propose an autonomous underwater vehicle, allowing for fewer sensors to make dense measurements over wider areas [1]. The mechanical subsystem of the vehicle consists of BlueRobotics' BlueROV2, a high-performance remotely operated vehicle. Utilizing the on-board GPS, gyroscope, accelerometer, and depth sensors and sensor fusion techniques via Kalman filtering, the system becomes capable of waypoint navigation. In addition, an onboard Raspberry Pi is programmed to adaptively plot a course to more densely sample potential sources of pollution based on past sensor data. The planner also considers crowdsourced data from users who indicate possibly pollution sources with a mobile app. In the case that a single vehicle navigates the waters satisfactorily, we may extend the project scope to include support for a swarm of such vehicles, coordinating underwater to effectively sample large bodies of water at a much higher resolution.