# Towards Long-Term Autonomy:
# Priors and Persistence in Ocean Observation with Autonomous Robots

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**MSB 114**

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**2:30-3:00pm Coffee Hour**
**3:00-4:00 pm Seminar**

## Abstract

**With existing aquatic robots having endurances ranging from a few days to months, a core challenge is predicting or deciding where and/or when to deploy these assets to maximize the information gain with respect to the process of interest over the duration of the deployment. This challenge has motivated investigation into the utility of a priori measurements and/or predictions (priors) to solve path planning and asset allocation problems. The need for such prior information is motivated by: 1) robots have limited resources, 2) we need to plan robot motion, 3) we need to plan efficient robot motion when operating in an environment as complex as the ocean, and 4) effective ocean observation requires accurate spatiotemporal sampling - gathering data within or following a specific mass of water. Here, we examine the use of priors for planning science-driven mission objectives for aquatic robots to study coral reef ecology, algal blooms and nutrient flux. Simulation and experimental results are presented to demonstrate the ability of the proposed techniques to resolve large-scale events, while simultaneously collecting high-resolution data for smaller-scale processes. We additionally examine future directions for research in marine autonomy based on a science-driven mission.**

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