UCLA
Posters

## Title
Networked Aquatic Microbial Observing Systems: An Overview

## Permalink
https://escholarship.org/uc/item/2vh5g17p

## Authors
Caron, David
Stauffer, Beth
Darjany, Lindsay
et al.

## Publication Date
2009-05-12

eScholarship.org Powered by the California Digital Library
University of California

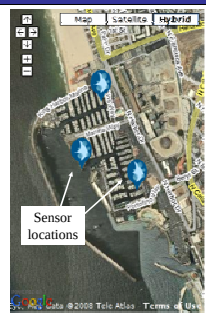
# Networked Aquatic Microbial Observing Systems: an overview

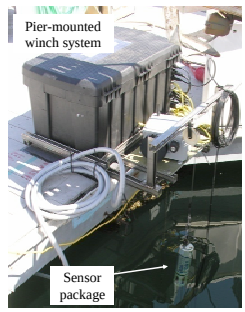
**David Caron, Beth Stauffer, Lindsay Darjany, Carl Oberg, Arvind Pereira, Jnaneshwar Das, Hordur Heidarsson, Ryan Smith, Ellen Smith, Erica Seubert, Marie-Eve Garneau, Meredith Howard, Burt Jones, Ivona Cetinic and Gaurav Sukhatme,**
**University of Southern California, Marine Environmental Biology & Computer Science**

## Introduction: NAMOS in King Harbor, Redondo Beach, and the Coastal Ocean

### Research Goals

- **Development of autonomous networks of heterogeneous sensors to monitor and sample changes in coastal marine environments using a combination of static and mobile platforms for sensor mounting and movement.**
- **The network should be able to adapt itself by directing mobile entities (robotic boat, autonomous glider) to regions or depths of interest (based on on-board or observer-based analysis of information streaming from the network).**
- **The network should be able to locate, track and study the growth and migration patterns of algal blooms such as those caused by red tide microalgae at temporal and spatial scales relevant to the organisms.**

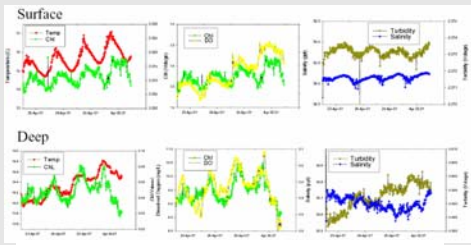



## Problem Description: Deploy an Autonomous Network for Monitoring Coastal Marine Environments

### Combined static and mobile sensor network in support of water quality studies of harbors and inland waters

- Sensor-equipped buoys, robotic boats and pier-mounted, vertical-profiling sensor packages provide high temporal & spatial resolution of pertinent environmental and biological parameters.

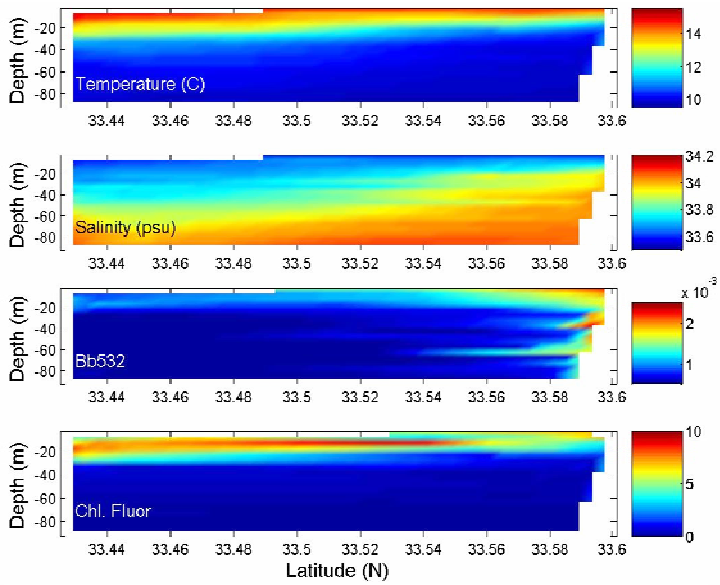



Four-day patterns of sensor data streaming from network in King Harbor.


## Proposed Solution: The Autonomous Networked Aquatic Microbial Observing System

### Combined Static & Mobile Data Systems in support of environmental monitoring of harmful algal blooms and water quality


- Application of real-time monitoring in aquatic ecosystems. Synoptic measurements of chemical, physical and biological information along horizontal transect lines using autonomous vehicles.
- Combined use of static buoy, mobile robotic boat and underwater vehicles to gain contextual information on a variety of scales.
- Integration of meteorological and hydrographic information (wind, surface current directions and velocities).
- Enhanced algorithms for station-keeping capabilities of autonomous sensing vehicles.
- Design of adaptive sampling algorithms with rich models of actuation cost.
- 'On the fly' downloading of information to land-based stations for incorporation into regional ocean models for near-real-time visualization of data.
- Retasking of autonomous vehicles during missions based on continuous data transmission to update models in order to optimize use of sensing capabilities.
- Directed studies on the roles of growth, mortality & microalgal behavior in phytoplankton bloom dynamics provide insight into the factors promoting harmful algal blooms.




2-D rendition (depth vs. distance) of sensed data collected by the AUV along a nearshore (right) to offshore (left) transect