Low-Cost Ocean Instrumentation Workshop

Woods Hole Oceanographic Institution

October 19–22, 2026

Draft agenda — October 16, 2026

Location	WHOI DeepTech Facility, Woods Hole, Massachusetts
Hands-on Sessions	October 23 and October 26–27 (optional)
Supported by	Schmidt Sciences and the U.S. Office of Naval Research
Remote access (Zoom)	Link sent by email to registered participants

Workshop Objectives

Affordable, scalable ocean observing systems have the potential to substantially expand observations of the coastal and open ocean by enabling measurements at spatial and temporal scales that are difficult to achieve using traditional research-grade instrumentation. This workshop brings together researchers, engineers, and technologists to exchange technical knowledge, demonstrate emerging technologies, discuss common engineering challenges, and develop collaborations that advance reliable, low-cost ocean observing systems.

Specific objectives:

- Review recent advances in low-cost oceanographic and marine environmental instrumentation.
- Identify scientific and operational observing needs that can be addressed by affordable sensor technologies.
- Share best practices in sensor design, fabrication, calibration, deployment, and long-term operation.
- Foster collaborations among universities, industry, and nonprofit organizations.
- Develop recommendations and priorities for future technology development and collaborative projects.

Program

Talks are 15 minutes plus 5 minutes for questions.

Monday, October 19	
08:00–09:00	*Registration and breakfast*
09:00–09:20	Welcome and workshop objectives — Tom Farrar (WHOI) Remarks — Emily Shroyer (ONR)
09:20–10:30	Ahmed Aslam Waheed (Maldives National University; remote, 5-min lightning talk) — *Challenges and opportunities in making ocean observations affordable in the Maldives* Jessica Sandoval (AquaVela; remote) — *Accessible Ocean Technology (AOT) for cost-effective, community-driven ocean observing* Andrew Thaler (Oceanography for Everyone) — *OpenCTD: a low-cost, open-source CTD for ocean research* Kyla Drushka (UW-APL) — *Backyard Buoys*
10:30–11:00	*Break*
11:00–12:00	Kingsley Kojo Darko (University of Ghana) — *Low-cost surface drifters for investigating microplastic transport and dispersion in the Gulf of Guinea* Wayne Pavalko (Maker Buoy) — *Low-cost ocean observing with Maker Buoys* Moses Salami (NIOMR, Nigeria; remote) — *Challenges and opportunities for affordable ocean observations in the Bight of Benin, Gulf of Guinea* Discussion
12:00–13:00	*Lunch*

13:00–14:30	Brennan Phillips (URI) — *3D-printed pressure housings and fiber-optic microtethers for low-cost deep-sea exploration* Christopher Piecuch (WHOI) — *Observing needs for coastal flooding and sea level* Drew Lucas (Scripps) — *Waves and tides from a low-cost RTK GNSS buoy* Jacob Davis (WHOI) — *Design considerations for low-cost, air-deployable wave buoys* Discussion
14:30–15:00	*Break*
15:00–16:30	Victor Adutwum (KNUST) — *A low-cost multi-sensor coastal instrumentation platform for the Keta coast of Ghana* Levi Gorrell (WHOI) — *Design considerations for a low-cost water-level sensor* Jonathan Pfeifer (WHOI) — *Open-source sensor engineering and the pHrog low-cost pH sensor* Ersen's Joseph (WHOI) — *Low-cost moorings for coastal measurements offshore of Ghana* Discussion
16:30–17:30	**Lightning talks (5 minutes each)** Nick Lowell (Lowell Instruments) — *From basement to ocean: building practical, affordable instruments* Michael Edem Donkor (KNUST) — *Strengthening local scientific capacity through low-cost instrumentation* Akyana Britwum (KNUST) — *Research sovereignty and low-cost ocean instrumentation in low-resourced settings* Thomas Dwomoh (KNUST) — *Monitoring saltwater intrusion in coastal Ghana: developing capabilities with low-cost OhmPi ERT systems*
Tuesday, October 20	
09:00–10:30	Seth Schweitzer (Cornell) — *Measurements of surface flow using infrared and visible-light images* Evan Heberlein (Cornell) — *Field applications of surface velocimetry in tidal systems* Amina Schartup (Scripps) — *A field-deployable method for measuring picomolar mercury levels in natural waters* Oladipo Mumin Olatunji (Kola Daisi University, Nigeria; remote) — *Building low-cost scientific instruments for environmental monitoring: a perspective from Nigeria, West Africa* Discussion
10:30–11:00	*Break*
11:00–12:30	Oluwabukola Babalola (Miri Africa, Nigeria; remote) — Title TBD Melissa Omand (URI) — *Canoe-attached sensors in coastal Ghana* Raimund Mullin (Blue Robotics) — *Making ocean technology accessible by design with Blue Robotics* Zachariah Mears (Blue Robotics) — *Modular by design: how Blue Robotics builds accessible ocean instrumentation fast* Discussion
12:30–13:30	*Lunch*
13:30–14:30	Yixuan Song (URI) — *Visualizing ocean particle flux with low-cost imaging systems* Comfort Opoku (University of Ghana) — *Imaging and machine learning approaches to assess zooplankton contributions to deep-ocean carbon export* Stefania Emunah (University of Ghana) — *Expanding carbon flux observations to coastal African upwelling ecosystems using scalable particle imaging instruments*
14:30–15:00	**Lightning talks (5 minutes each)** Dipanjan Chaudhuri (UW-APL) — *Cost-conscious measurements in the coastal waters of Bangladesh* Maurice Edusei (University of Ghana) — *From samples to sustained observations: building affordable ocean acidification capacity in Ghana* Moise Busogi (CMU-Africa) — *Who gets to measure the world?*
15:00–15:30	*Break*
15:30–17:00	**Demonstrations** Canoe trackers, OMI drifters, uROAM, Snocams, and MINIONs — Melissa Omand (URI) pHrog pH sensor — Jonathan Pfeifer (WHOI) Maker Buoy hardware and kits — Wayne Pavalko (Maker Buoy) Participants are welcome to bring instruments to demonstrate

Wednesday, October 21	
09:00–10:30	Shah Selbe (FieldKit) — *FieldKit Underwater: development and manufacturing of a low-cost sonde for water-chemistry measurement* Alex Kinsella (WHOI) — *Developing a full-sky thermal camera to advance cloud remote sensing at sea* Demonstration of the thermal camera/logger (David Center) — Alex Kinsella (10–15 min) Rupak Loodh (BORI, Bangladesh) — *Cost-conscious ocean observations in Bangladesh* Lt. Ekemini Williamson (Nigerian Navy; remote, 5-min lightning talk) — *Ocean monitoring at Nigeria's National Hydrographic Agency: efforts and challenges* Discussion
10:30–11:00	*Break*
11:00–11:20	Bernard Akaawase (WHOI) — *A DIY wave flume and portable airborne mapping system*
11:20–12:30	**Open discussion**
12:30–13:30	*Lunch*
13:30–14:15	**WHOI Rigging Shop tour** Led by Chris Ross
14:15–15:00	**DeepTech demonstrations and facility tours**
15:00–15:30	*Break*
15:30–17:00	**Breakout discussions**
Thursday, October 22	
09:00–10:30	**WHOI dock tour** Meet at the WHOI Visitor Center, 93 Water Street, Woods Hole
10:30–11:00	*Break (return to the David Center)*
11:00–12:00	**Breakout reports**
12:00–12:30	**Workshop roadmap, report planning, and closing remarks**
12:30–13:30	*Lunch; main workshop adjourns*
13:30–16:00	**Optional: OpenCTD build preparation — introduction to soldering and software setup (WHOI DeepTech facility)** Andrew Thaler (Oceanography for Everyone)
Friday, October 23 and Monday–Tuesday, October 26–27 (optional)	
All day	**Hands-on development sessions — WHOI DeepTech facility** OpenCTD build in small teams, led by Andrew Thaler Short presentation by Samuel Tawiah (University of Ghana): *Reducing the cost of ocean observations in Ghana: tools, instrumentation, measurements, and maintenance* Other builds and test deployments to be announced