Center for Ocean Leadership

IOOS Integrated Ocean Observing System

University of South Florida College of Marine Science

UG2 Underwater Glider User Group

UG2 WORKSHOP ’26

May 18-20, 2026

Scientific Research
Training & Education
Regional Trends
Next Generation Autonomy
Data Infrastructure
Ecosystem Monitoring

University Student Center • USF St. Petersburg • 200 6th Avenue South • St. Petersburg, FL

Official Program

Underwater Glider User Group

Our Mission:

To be a community-based coalition aimed at bolstering scientific collaboration, information, and resource sharing for gliders.

About UG2 Workshop '26

Basis for the Workshop:

The fifth Underwater Glider User Group (UG2) Workshop will help strengthen and coordinate underwater glider activities for marine monitoring, services, and scientific research as well as provide an opportunity for continued collaboration between the United States UG2 and the broader global community.

Meeting Goals:

The overarching goal of UG2 is to establish a community that facilitates sharing and cooperation of glider mission resources both in the U.S. and internationally within areas of ocean monitoring, operational reliability, and data management. This workshop is designed to strengthen this collaboration through community dialogue, information exchange, sharing of experiences and research, and development of priorities and action items for the future.

2026 Workshop Objectives:

1. **Harmonize Glider Efforts:** Data management, leveraging partnerships, documenting best practices, collaboration within U.S. and international community;
2. **Share New Developments:** Sensors, gliders, emerging requirements, novel glider applications;
3. **Share/Refine Operational Activities:** Sustained observing, reliability, sampling strategies, ocean modeling impacts (physical and biological);
4. **Identify Action Items and Needs for UG2:** Determine gaps in UG2 communication platforms; international partnerships, share functionality of newsletter, Slack and LinkedIn; identify needs for UG2 (next steps); and
5. **Network with Glider Users:** Communicate with glider users from across the United States and globally to build collaboration and strengthen partnerships.

Workshop Components:

Oral Presentations. Glider experts will update the community with science, practice, and case studies. Practitioners representing the full scope of the glider community, from federal, state, and local agencies, to industry, and academia, will cover a wide breadth of examples, methodologies, key research findings, and general uses of gliders.

Breakout Sessions. The breakout sessions are varied in their format and will create opportunities to interact with colleagues and work toward a specific outcome or goals, such as using gliders in the Gulf and their challenges, glider use in living ecosystem assessments, providing a space for pilot and operational questions, and aligning data management practices.

Poster Presentations. In order to promote networking between participants, the poster session will coincide with extended morning and afternoon coffee breaks and a lightning advertisement presentation session. Research, tools, and information will be showcased on a 36” x 48” poster.

Industry Sessions. There will be one key industry-focused session during the Workshop: a panel-based Q&A session with key industry partners to determine and outline community needs. Take time to also visit exhibitor booths and connect with industry representatives.

Early Career Events. A Mentor Match-Up and an interactive early-career lunch featuring a panel of ocean glider professionals will be held. For details, see the *Other Events* section of the program.

Agenda Day 1: May 18

08:00 Registration & Coffee

08:30 Day 1 Opening | Georgia Coward, UG2 Coordinator

- **Welcome to UG2 Workshop and Logistics** | Georgia Coward, UCAR COL
- **Welcome to the Gulf and USF** | Tom Frazer and Chad Lembke, University of South Florida College of Marine Science
- **OceanGliders Update** | Robert Todd, Woods Hole Oceanographic Institution
- **Overview of Goals for this Workshop** | Georgia Coward, UCAR COL

09:00 Oral Presentations: Climate Trends and Regional Oceanography | Chairs: Cordie Goodrich and Erica Fruh

- **Daniel Rudnick**, Scripps Institution of Oceanography: *The mean coastal upwelling circulation in the Southern California Current System*
- **Miguel Tenreiro**, CICESE: *A decade gliding through Mexican waters*
- **Robert Todd**, Woods Hole Oceanographic Institution: *Gliders in the Gulf Stream: Looking toward the second decade of sustained observing*
- **Sean Beckwith**, University of South Florida College of Marine Science: *Comparison of glider-derived and modeled sound speed profiles as hydrographic tools on the West Florida Shelf*
- **Hana Hourston**, Dalhousie University*: An assessment of mean conditions, trends, and variability on the central Scotian Shelf using ship-based observations and autonomous vehicles*

10:15 Break | UG2 Mentorship Match-Up

11:00 Breakout Sessions

- **Session 1: Technical Operations and Logistics** | Facilitators: Karen Dreger, Skidaway Institute of Oceanography; Bill Lingsch, IOOS; Doug Wilson, University of the Virgin Islands; Kevin Martin, University of Southern Mississippi
- **Session 2: Gliders in Fisheries/Living Marine Resource Assessment** | Facilitator: Erica Fruh, NOAA Uncrewed Systems Division

12:30 Lunch

13:30 Oral Presentations: Next Generation Autonomy | Chairs: Mat Dever and Rebecca Walsh

- **Ben Allsup**, National Oceanography Centre: *Increasing operational capabilities of Slocum gliders at NOC*
- **Steve Pearce**, ASL Environmental Sciences: *What's new at ASL: AZFP developments*
- **Ellis Keener-LaCroix**, Ocean Tracking Network: *Creating a glider piloting tool to avoid strikes in high vessel traffic areas*
- **Patrick Spezzano**, Rutgers University: *The Glider Guidance System 3: Advances in shoreside support of AUV operations*
- **Matthew Green**, Wassoc*: Wassoc Shadowgraph: Collaborative Innovation*

14:45 Poster Lightning Talk Advertisements ⚡ | Chair: Barb Kirkpatrick

15:30 Break

16:00 Poster Session

17:00 Day 1 Closing Remarks

17:05 Adjourn

17:30 Networking Event: Happy Hour

- ***The Hub*, 450 8th Ave SE, St. Petersburg**
  5:30 - 7:30pm. Local beers and other drinks and appetizers.
  Sponsored by the Marine Technology Society.

MTS marine technology society
Opportunity runs deep™

Agenda Day 2: May 19

08:00 Late Registration & Coffee

08:30 Welcome | Georgia Coward, UG2 Coordinator

- **Day 1 Recap & Day 2 Setup**

08:45 Keynote | Travis Miles, Rutgers University and Barb Kirkpatrick, TAMU

09:15 Oral Presentations: Integrated Ecosystem Monitoring (Acoustics and Optics) | Chairs: Saraswathy Sabu and Dan Rudnick

- **Anthony Cossio**, NOAA/ Southwest Fisheries Science Center: *Sound evolution: How we have used glider-integrated active acoustic systems for zooplankton density and biomass estimates*
- **Jen Walsh**, NOAA/Southwest Fisheries Science Center: *What we do in the shadows, part II: Advances in NOAA's artificial intelligence/machine learning pipelines for automated analysis of shadowgraph imagery from gliders*
- **Bo Yang**, University of South Florida: *In-situ estimates of net primary production on the West Florida shelf with underwater gliders*
- **Chad Lembke**, University of South Florida: *Utilization of gliders for Rice's whale understanding*
- **Mark Yamane**, University of Washington: *Characterizing zooplankton communities and maximizing near-real-time information content transfer using ShadowMetrics*
- **Shannon Rankin**, NOAA Pacific Islands Fisheries Science Center: *NOAA Fisheries Glider Challenge: Accelerating the use of passive acoustic-equipped gliders to monitor and assess cetacean populations in the Pacific*

10:45 Break

11:30 Breakout Sessions

- **Session 1: Data Infrastructure and Interoperability** | Co-Leads: Jennifer Bowers, NOAA NCEI; Jennifer Sevadjian, Scripps Institution of Oceanography
- **Session 2: Piloting - Q&A** | Facilitators: Karen Dreger, Skidaway Institute of Oceanography; Bill Lingsch, IOOS; Kevin Martin, University of Southern Mississippi; Doug Wilson, University of the Virgin Islands

13:00 Lunch

- **Early Career Mentorship Luncheon: Federal, Industry & Academic Panel** | Facilitators: Cassie Wilson, UCAR COL; Karen Dreger, Skidaway Institute of Oceanography

14:00 Breakout Sessions

- **Session 1: MTS Microcredentials** | Facilitators: Liesl Hotaling, MTS; Karen Dreger, Skidaway Institute of Oceanography
- **Session 2: Introduction to Grant and Proposal Writing** | Facilitator: Travis Miles, Rutgers University
- **Session 3: Integrating Acoustic Telemetry into Glider Operations** | Facilitator: Hank Statscewich, University of Alaska Fairbanks

15:15 Break

16:00 Oral Presentations: Payload Engineering and Operational Readiness | Chairs: Jen Bowers and Senam Tsei

- **Dean Fougere**, D-2 Incorporated: *The D-2 Hybrid CTD sensor: Description and evaluation*
- **Mathieu Dever**, RBR / WHOI: *Getting the most out of RBR instruments on gliders: Best practices for RBRlegato⁴, RBRlegato³, RBRcoda T.ODO and RBRtridente*
- **Benjamin Werb**, Monterey Bay Aquarium Research Institute: *Sustained pH observations from underwater glider networks in the US*
- **Jimmy Spore**, Woods Hole Group: *Satellite telemetry for gliders: Present and future capabilities*

17:00 Adjourn

17:15 Networking Event: Happy Hour

- ***The Tavern at Bayboro*, 120 6th Ave S, St. Petersburg**
  5:15 - 7:15pm. Drinks and light appetizers.
  Sponsored by Teledyne Marine.

Agenda Day 3: May 20

08:00 Coffee

08:30 Welcome | Georgia Coward, UG2 Coordinator

- **Day 2 Recap & Day 3 Setup**

08:45 International Partnerships and Logistics | Chairs: Jorge Brenner and Doug Wilson

10:00 Break

10:45 Looking Forward: AI and Gliders Discussion | Chairs: Jen Bowers and Bob Currier

- **Plenary Presentation:**
  Bob Currier, Texas A & M University - Oceanography / OCEANCODA LLC: *Going AI-Native: Production AI in Glider Operations*

11:45 Lead Partner Presentation: Teledyne Marine

12:00 Lunch - Sponsored by Teledyne Marine

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13:00 Industry Panel Session: Community Needs and Next Steps | Chair: Bill Lingsch

14:00 Oral Presentations: Workforce Development & Education | Chairs: Jenn Sevadjian and John Horne

- **Carlos Barrera**, PLOCAN: *PLOCAN Glider School: Fifteen years of training and international engagement in ocean-glider technology*
- **William Menapace**, University of Washington: *Training students through repeated seaglider missions: Investigating seasonal dynamics in Puget Sound*
- **Liesl Hotaling**, MTS: *Building an ocean technician workforce using microcredentials*

14:45 Break

15:15 Oral Presentations: Data Infrastructure and Interoperability | Chairs: Sarina Mann and Jochen Klinke

- **Jenn Sevadjian**, Scripps Institute of Oceanography: *Next generation data systems for the California Underwater Glider Network*
- **Aaron Mau**, Voice of the Ocean Foundation: *Gliding clearly: The role of open-source and non-academic actors in global ocean glider data*
- **Leila Baghdad Brahim**, Tetratech, Ocean Science: *Configurable QARTOD quality control for environmental variables: A data-driven, JSON-based approach for GDAC submissions*

16:00 Community Feedback and Ideas: UG2 Workshop | Georgia Coward

16:15 Closing Remarks | Jorge Brenner, GCOOS Director

16:30 Adjourn

Breakout Sessions

Breakout sessions are an important aspect of the 2026 UG2 Workshop in St. Petersburg. These sessions are varied in their format and will create opportunities to interact with colleagues and work toward a specific outcome or goals. You will have several opportunities to participate in facilitated breakout sessions. The topics of focus include: **MTS Microcredentials**, **Piloting**, **Technical Operations, Gliders in Fisheries**, and **Data Management**.

DAY 1 | **May 18** **11:00 - 12:30**

Technical Operations and Logistics

Facilitators: Karen Dreger, Skidaway Institute of Oceanography; Kevin Martin, University of Southern Mississippi; Doug Wilson, University of the Virgin Islands

Join a group discussion covering all topics related to the logistics and technical operations that go into a successful glider mission. From lab prep to overcoming challenges at sea and getting the glider safely back into your lab, this session will be an opportunity to ask questions and discuss technical troubleshooting, field ops, recommendations and best practices. This is the perfect opportunity to learn from your peers and share your experiences.

Gliders in Fisheries/Living Marine Resources Assessments

Facilitator: Erica Fruh, NOAA UxS Operations Center, UMS Division

The goal of this session is to discuss how the scientific community has utilized gliders in support of living marine resource assessments. We will utilize presentations by cross sector experts to provide an overview of the current status of glider-based living marine resource assessments. An effort will be made to highlight work across sectors, ocean basins, sensors/platforms, and study species. Presenters will also discuss existing challenges and gaps in the application of gliders in their work. Following presentations, the entire session will engage in facilitated discussion to push the ball forward regarding this glider application. We aim to walk away from the session with an improved understanding of glider-based living marine resource assessments, the community working on this, existing limitations/gaps, and areas to engage in the future.

DAY 2 | May 19 **11:30 - 13:00**

Data Infrastructure and Interoperability

Co-Leads: Jennifer Bowers, NOAA NCEI; Jennifer Sevadjian, Scripps Institution of Oceanography

This breakout session examines how the ocean observing community can evolve from traditional archiving toward truly AI-Ready Data — datasets that are discoverable, interoperable, and optimized for emerging analytical tools. Participants will explore the technical, organizational, and societal dimensions of preparing glider data for next-generation applications, from cloud-native workflows to advanced modeling and policy-relevant insights.

Core focus areas: Current Capabilities & Technical Workflows; Data Integrity & Risks; Bridging the Gap: Data to Policy

Piloting - Q&A

Facilitators: Karen Dreger, Skidaway Institute of Oceanography; Bill Lingsch, IOOS; Kevin Martin, University of Southern Mississippi; Doug Wilson, University of the Virgin Islands

Join us for a session dedicated to piloting gliders and hear from our panelists about the challenges and triumphs they have encountered. After a brief presentation from the panel, there will be time for questions and broader discussions. This is the perfect opportunity to ask our panel of pilots your questions, troubleshoot errors, and get recommendations from experienced operators.

DAY 2 | May 19 **14:00 - 15:15**

MTS Microcredentials: Discussion of next steps

Facilitators: Liesl Hotaling, MTS; Karen Dreger, Skidaway Institute of Oceanography at the University of Georgia

The session will focus on sharing the concept of the Marine Technology Society (MTS) microcredentials and their utility in codifying marine technology use and workforce preparation. The competencies and evaluation rubrics created thus far will be shared. Please join us for a discussion about the application and relevance of the microcredential framework in small working groups and offer comments and suggestions for revision and improvement. In addition, information regarding how to become a local provider of the microcredentials will be shared.

Intro to Grant and Proposal Writing Training

Facilitator: Travis Miles, Rutgers University

This session will focus on general thoughts and considerations for submitting a proposal to various funding agencies. We plan to cover topics such as how to craft proposals for different agencies (e.g., NSF, NOAA, NASA), what information should be included in the different components of a proposal, and considerations for budgeting. This session is open to all participants, but the content will be geared towards early-career participants planning to write their first proposal.

Integrating Acoustic Telemetry into Glider Operations

Facilitator: Hank Statscewich, University of Alaska Fairbanks

Established in 2016, the U.S. Animal Telemetry Network (ATN) is a multi-agency network that provides unity, stability, and continuity to the national infrastructure that facilitates the collection, management, and accessibility of marine animal telemetry data. As the ATN enters its next five-year strategic cycle, a primary priority is the expansion of the acoustic telemetry community and the seamless ingestion of acoustic detection data into the ATN Data Assembly Center (DAC). While stationary acoustic receiver arrays provide critical coastal monitoring, they are limited by their fixed nature and generally restricted to coastal waters. To complement existing coastal receiver arrays and expand offshore monitoring to better track highly mobile and migratory species, the ATN is turning to the underwater glider community.

This breakout session will explore the low-impact, high-value potential of equipping underwater gliders with acoustic receivers. By co-locating animal detection data with standard glider-collected environmental parameters, researchers will be better equipped to identify specific environmental drivers of habitat use and migratory pathways in offshore environments and make more informed ecosystem-based management decisions.

Oral Presentations & Posters

Oral Presentations: Climate Trends and Regional Oceanography

In order of appearance in the Workshop Agenda

DAY 1 | May 18 **09:00 - 10:15**

The mean coastal upwelling circulation in the Southern California Current System

***Daniel L. Rudnick**, Scripps Institution of Oceanography; T. M. Shaun Johnston, SIO, UCSD*

Equatorward winds off California transport coastal surface waters offshore, which are replaced by deeper onshore flow that upwells. The mean upwelling cell is rarely measured directly because its magnitude is small compared to other variability. From 2019--2024 on an alongshore line in the California Current System, Spray underwater gliders in the California Underwater Glider Network measured the across-shore currents offshore of the Southern California Bight. Glider-mounted Acoustic Doppler Current Profilers provide the total current. Thermal-wind shear from the alongshore density gradient is referenced to the glider-measured, depth-mean velocity and provides the absolute across-shore geostrophic current. The wind-driven across-shore velocity is the difference between the total and geostrophic velocities. The onshore geostrophic and offshore wind-driven components are both vertically sheared, which highlights the importance of measuring the alongshore density gradient. The competition between these flows, with wind-driving stronger at the surface, and geostrophic currents extending deeper, produces the overturning cell and determines the source depth. The overturning cell exists above 130 m: offshore flow exists above 30 m, while onshore flow reaches peaks at 60 m. The vertical velocity is over 25 cm/day at 30 m. These results suggest an update to the canonical view of coastal upwelling that has existed for several decades wherein an alongshore density gradient is an essential element to support an onshore source flow to feed the well-known offshore wind-driven flow near the surface.

A decade gliding through Mexican waters

***Miguel Tenreiro**, Centro de Investigación Científica y de Educación Superior de Ensenada, Baja California, México (CICESE); Enric Pallàs Sanz, CICESE*

Since 2016, the GMOG-CICESE group (gliders.cicese.mx) has conducted 47 autonomous underwater glider missions in Mexican waters. These observations have been mainly supported through Mexican funding, as well as collaboration with the United States and Cuba. The aim is to produce scientific data that guide socioeconomic activities and support decision-making on future environmental challenges in heavily exploited regions severely impacted by extreme events. Underwater gliders are well suited to study water-column variability and processes at multiple scales, as well as providing repeated vertical profiles of essential oceanographic variables (EOVs). These data improve numerical forecast models used to mitigate the impact of extreme events in densely populated areas. Sharing glider data through the Ocean Observing for Climate, Ocean Health, and Real-Time Services program (https://gcoos.org/; Testor et al. 2019) enhances forecasts of rapid tropical cyclone intensification and landfall trajectories. In order to engage oil and gas companies, Mexican public agencies, and international partners in sampling different ocean regions, it is crucial to secure funding for future glider operations to support long-term EOV time series. These are crucial for refining our understanding of low-frequency physical and biogeochemical processes related to climate change. Based on historical altimetry and long-term glider observations, we have developed several statistical products relying on climatological conditions. We will present statistics from the initial dataset, data distribution protocols, and the GMOG-CICESE real-time visualization platform.

Gliders in the Gulf Stream: Looking toward the second decade of sustained observing

***Robert E. Todd**, WHOI*

Since 2015, gliders have been routinely surveying across the Gulf Stream along the US East Coast. During more than 70 missions and over 15 glider-years at sea, Spray gliders have occupied more than 500 cross-Gulf Stream transects and returned over 45,000 profiles. A review of recent results highlights the growing impact of the sustained observational effort. These include 1) development of three-dimensional, seasonal climatologies; 2) characterization of decadal warming and shifting of the Gulf Stream; and 3) evaluation of the observations' impact on an operational numerical model. Over the past year, new Spray2 gliders equipped with additional biogeochemical sensors have begun surveying the Gulf Stream. As the program moves into its second decade, comprehensive physical and biogeochemical sampling will enable a host of new investigations. As a contribution to OceanGliders, Gulf Stream observing efforts serve as a model for sustained glider-based sampling along other energetic ocean margins.

Comparison of glider-derived and modeled sound speed profiles as hydrographic tools on the West Florida Shelf

***Sean Beckwith**, Chad Lembke, Mark Luther, Matt Hommeyer, Grace Angeli, Eloise Cole, Alex Silverman, Heather Broadbent, Randy Russell, Kaili Qiao, Haibo Xu, Yonggang Liu: University of South Florida*

Underwater gliders deliver sustained ocean measurements via low power consumption, a potential benefit to hydrographic surveys. Gliders can directly contribute to traditional surveys by enhancing the sound field data collected in the vicinity of surface vessels mapping the seafloor in high-resolution. This scenario was tested on the central West Florida Shelf in the fall of 2023, with two gliders sending near-real time sound speed profiles derived from output of the CTD to a nearby research vessel acquiring high-resolution seafloor data. As a post processing application, these same sound speed profiles were compared to a model to assess its ability to produce sound speed information. The West Florida Coastal Ocean Model, a physical oceanographic model produced and maintained by the USF Ocean Circulation Group, outputs salinity and temperature at predetermined depth intervals, which can be used to compute sound speed profiles for a particular location. For two study sites on the West Florida Shelf, sound speed profiles were generated at model node locations nearest the path traversed by gliders at the site visited in September 2023, a prominent seafloor feature known as the Elbow (EL), and at the Florida Middle Grounds (FMG) in March 2025. For the FMG site, the USF glider group coordinated with the Ocean Mapping division of Saildrone, who were tasked with mapping this well-known area of high seafloor rugosity. Co-locating a glider in the vicinity of two drones mapping the target area coincided with acquiring model output data from the Ocean Circulation Group. Limited comparison points exist from the EL study, whereas a more comprehensive set of comparisons were made from the FMG study. However, the greater water column heterogeneity at the EL site resulted in more dynamic sound speed profiles. Preliminary analysis of the glider and model profiles reveals a better fit of the model data to glider data for the EL region (R2 = 0.846) versus the FMG region (R2 = 0.102). More evidence is needed to answer the question as to whether physical oceanographic models can be used standalone, or in tandem with autonomous underwater vehicles, to augment the sound fields acquired for seafloor mapping. Bathymetry derived by or enhanced by non-traditional means will likely represent an increasing portion of seafloor products in the future. As for the role of gliders, specifically, the suite of sensors typically integrated within their payload designates these vehicles as value-added assets for subsea mapping and exploration.

An assessment of mean conditions, trends, and variability on the central Scotian Shelf using ship-based observations and autonomous vehicles

***Hana Hourston**[1], Ruth Musgrave[1], Clark Richards[1,2], Mathieu Dever[1,3], Carolyn Buchwald[1]*

[1]Dalhousie University; [2]Fisheries and Oceans Canada; [3]RBR

The Scotian Shelf and Slope are located at the confluence of the Labrador Current and the Gulf Stream in the Northwest Atlantic Ocean and provide essential habitat for commercially important species. Primary production in this dynamic region depends directly on the nutrient levels within and the relative contributions of the different water masses present. Mean conditions, trends, and variability of water masses along a 550 km transect of the central Scotian Shelf (CSS) are determined using 29 years of biannual ship-based observations and 15 years of monthly observations from underwater gliders. Seasonal glider-derived climatologies for the period 2011-2025 illustrate a transition from a two-layer vertical structure in the spring to a three-layer structure in the fall, which also appears in the ship-based climatologies. Mean water mass temperature and salinity are computed from repeat upstream profiles and projected into temperature-salinity space to use as mixing triangle endmembers for the CSS. Time series of endmember properties show high interannual variability in Cabot Strait subsurface (CBSs) water and Warm Slope Water (WSW), medium variability in Inshore Labrador Current (InLC) water and Cabot Strait-Cold Intermediate Layer (CBS-CIL) water, and low variability in Labrador Slope Water (LSW). Mixing lines are observed year-round in the glider data between the CBSs and WSW, as well as between the WSW and LSW, while mixing between the CBS-CIL and WSW is not apparent. Future work will evaluate mean conditions and trends in Nova Scotia Current transport from glider-derived estimates of alongshore current velocities.

Oral Presentations: Next Generation Autonomy

In order of appearance in the Workshop Agenda

DAY 1 | May 18 **13:30 - 14:45**

Increasing operational capabilities of Slocum gliders at NOC

***Ben Allsup**, National Oceanography Centre*

Ocean gliders are a key tool used by the oceanographic community to observe the world's oceans. Stakeholders are presenting glider operational teams with ever more complex problems. The solutions require expanding features, providing new capabilities, alternative and sometimes novel methods and approaches for managing increasingly challenging missions in the context of expanding fleets of gliders. With the largest fleet of gliders in Europe, the National Oceanography Centre (NOC) is increasing operational possibilities by investing in new capabilities. Significant projects include, MAS-DT a digital twin approach to Ai operated vehicles, "backseat driver" mission control, initially for operations near and under ice and finally the maturing of the Teledyne Webb Research certified Slocum Glider Service Centre imbedded in the NOC facility. These efforts are providing capabilities such as autonomous waypoint generation to optimize glider paths for research applications in regions with complex currents, and will eventually increase the value and length of observations provided to operational models. In the near future these efforts will allow for the operation of increasingly complex and frequent missions with less burden put on pilots. The ongoing development of back seat control will allow for onboard navigation in absence of GPS whilst providing more advanced decision making in hazardous ice-covered locations. NOC's presentation will summarize the progress with efforts to increase operational latitude whilst minimizing piloting stressors and vehicle down time.

What's new at ASL: AZFP developments

***Steve Pearce**, Jan Buermans, Amanda Dash: ASL Environmental Services*

Recent and ongoing updates to the Acoustic Zooplankton Fish Profiler (AZFP) are relevant to researchers using an AZFP on platforms such as the Slocum glider. Past updates include electronics modifications to accept the higher input voltage associated with Li-rechargeable batteries. Ongoing updates include the release of a new sixth-generation electronics package, featuring increased onboard memory and the potential for more frequent pinging from the AZFP. The development of a compact and self-contained instrument, the AZFP-nano, is also discussed. The AZFP-nano is suited for 'wet payload bay' integration, allowing researchers faster turnaround when recalibration is desired. This presentation highlights such developments and their implications for researchers.Also highlighted is a recently completed special project involving development of real-time analytics and AI edge processing implemented on an ODROID ARM single board computer. This project saw the integration of the AZFP onto an uncrewed surface vehicle for real-time control and data transmission.

AI models were developed and implemented on the ODROID to perform anomaly detection on the real-time AZFP data, which are then transmitted to shore. This development facilitates data interpretation on the fly and dynamic changes to mission profile based upon the interpreted data.

Creating a glider piloting tool to avoid strikes in high vessel traffic areas

***Ellis Keener-LaCroix**, Ocean Tracking Network*

The Ocean Tracking Network (OTN) glider program has been operating gliders in high traffic shipping zones of the Gulf of St. Lawrence (GOSL) monitoring for North Atlantic right whales (NARW) for the last five years to support Transport Canada's ship strike mitigation strategies. Nominally the gliders operate in the 7 km wide middle zone between the inbound and outbound lanes. However, the gliders occasionally cross lanes, or accidentally drift into them. To transmit NARW detections, the gliders must surface for 1020 minutes every 4-6 hours. Surfacing outside designated safe zones increases the risk of vessel strikes to gliders. To mitigate this risk, we wanted an easy way to know if a glider was in a safe area to transmit data, without constantly waking up pilots to have them reference multiple sources just to know if a glider is safe enough to transmit data. Last year we developed software to assist piloting and tested it using three gliders deployed between the GOSL shipping lanes, called "Glider Function Automation Control" (GFAC). GFAC is a web application we built to track and help control gliders by using the REST API that Teledyne's SFMC provides. GFAC operates mainly through "geofence" based safe zones, but as of this year we're going to be using AIS ship tracking data for additional glider safety checks. In this presentation we will discuss the technical details on how GFAC operates and the developmental challenges we faced.

The Glider Guidance System 3: Advances in shoreside support of AUV operations

***Patrick Spezzano**, Scott Glenn, Joe Gradone, Oscar Schofield, Alexander Lopez: Rutgers University*

Advances in vehicle capability and payload efficiency are pushing underwater gliders from regional campaigns toward multi-month to multi-year time horizons and across increasingly complex regions. However, shore-side piloting workflows have not kept pace with this shift, at these scales pilots must reconcile evolving ocean currents and weather windows with hard vehicle constraints (energy budget, endurance, communication cadence, and safety margins). Existing mission planning workflows remain largely manual, and often require manual synthesis across forecast products and repeated time-consuming replans as conditions evolve.

We present the Glider Guidance System 3 (GGS3), a decision-support and route-planning framework designed for glider operations. The GGS3 ingests multiple ocean forecast products and converts them into actionable mission guidance by estimating drift and along-track progress under forecast currents, evaluating potential tracks against vehicle and operational constraints, and generating routes/waypoints that balance mission objectives with risk and efficiency. The system produces pilot-facing products (e.g., depth-averaged current fields, drift summaries, and recommended tracklines) to support rapid iteration during near-real-time operations.

We demonstrate GGS3 in support of the Teledyne Webb Research Sentinel glider REDWING's attempt at the first global circumnavigation mission, where long mission segments and evolving mesoscale conditions amplify the cost of suboptimal routing. Examples from navigational decisions made during key moments of the initial Atlantic crossing show how GGS3 improves time and battery performance, while minimizing operational risks. We discuss how decision making support was provided during operations, the iterative refinement of the GGS3 based on operational constraints and pilot requirements, and the future of the GGS3 framework as a means to support future legs of the circumnavigation mission.

Wassoc Shadowgraph: Collaborative Innovation

***Matthew Green**, Wassoc*

The inception of the Shadowgraph was not because Wassoc had a history in microscopy. It wasn't because Wassoc had a deep understanding of sea gliders. The inception of the Shadowgraph was from a NOAA Scientist having an idea, and Wassoc knowing a thing or two about deep sea photography. The collaboration between Wassoc's engineers, and the scientists in the Shadowgraph community have allowed the Shadowgraph to accelerate into the autonomous, deep sea, machine vision, microscope that it is today. Continue the collaborative journey towards innovation.

Oral Presentations: Integrated Ecosystem Monitoring (Acoustics and Optics)

In order of appearance in the Workshop Agenda

DAY 2 | May 19 **09:15 - 10:45**

Sound evolution: How we have used glider-integrated active acoustic systems for zooplankton density and biomass estimates

***Anthony Cossio*[1]**, *Christian Reiss[2], Jennifer Walsh[1], George Cutter[3]*

[1]Ecosystem Science Division, Southwest Fisheries Science Center, NOAA; [2]Marea Oceanographic Services, San Diego, CA; [3]University of Delaware

Since 2018, NOAA's Ecosystem Science Division has been conducting resource and ecosystem surveys using scientific echosounders on Teledyne Webb Research (TWR) G3 Slocum gliders to assess the population of Antarctic krill (Euphausia superba) and the status of the pelagic ecosystem off the California coast. Originally we used a multifrequency system mounted in a payload bay, making servicing complicated and time consuming. In 2022, working with NORTEK Inc., we adapted their broadband Signature100 scientific echosounder to our gliders using TWRs external wet-bay system. In this talk we review some results of our deployments demonstrating the utility of this system. In particular, we review the results of a two-glider ""chase"" deployment in Antarctica and show that biomass estimates are within approximately 5% over a 50-day deployment. We also compare glider-processed and telemetered acoustic backscatter with raw post-deployment processing from a 30-day deployment in the California Current. Together, these deployments continue to demonstrate advancement of glider-based active acoustic systems. Future work will focus on more thorough comparisons between and among acoustic systems in order that managers can have increased confidence in advice derived from deployments of these systems.

What we do in the shadows, part II: Advances in NOAA's artificial intelligence/machine learning pipelines for automated analysis of shadowgraph imagery from gliders

***Jennifer Walsh*[1]**, *Christian Reiss[2], Andrew Leising[1], Samuel Woodman[1], Anthony Cossio[1], George Cutter[3]*

[1]Ecosystem Science Division, Southwest Fisheries Science Center, NOAA; [2]Marea Oceanographic Services, San Diego, CA; [3]University of Delaware

In 2022, NOAA's U.S. Antarctic Marine Living Resources Program (part of the Ecosystem Science Division; ESD) began using images from glider-integrated shadowgraph cameras as a replacement for vessel-based plankton net data to study the distributions and densities of small zooplankton in the Southern Ocean. During the last four years, shadowgraph glider deployments have extended to the California Current to augment vessel-based fishery assessments and to re-evaluate hypotheses about the habitats and vertical distributions of key zooplankton taxa in relation to water column properties. Over nine deployments lasting a cumulative 107 days, the ESD has collected more than one million shadowgraph images to develop artificial intelligence/machine learning pipelines for automated detection of common zooplankton species. Several parallel efforts are underway across multiple platforms to build and train detector and classification models, with promising results generated by using a combination of Matlab for identifying regions of interest in images and the NMFS-funded open-source toolkit Video and Image Analytics for Marine Environments (VIAME; Kitware, Inc.) for training models. Analyses of un-annotated images in VIAME yield results with high correlation coefficients when initial thresholds for identification are greater than 0.5. These results suggest that automated image analysis can substantially reduce the processing time of large imagery datasets and can facilitate rapid dissemination of results, with potential fishery management implications. Recent camera upgrades are poised to enhance image quality, potentially leading to improved model performance. Future ESD goals include integrating the results of shadowgraph image processing with active acoustic data obtained from gliders to develop a more holistic understanding of zooplankton densities and distributions across multiple oceans..

In-situ estimates of net primary production on the West Florida Shelf with underwater gliders

***Bo Yang**, Weiyi Tang, Chad Lembke, Heather Broadbent: University of South Florida College of Marine Science*

The West Florida Shelf (WFS) is a broad, shallow, low-gradient continental shelf with significant ecological and environmental importance in the Gulf of Mexico. As the basis of the marine ecosystem, understanding the net primary production (NPP) is vital for fishery management and environmental protection on the WFS. Historical studies of WFS NPP have been scarce due to the logistic complexity of ship-based measurements and the limitations of satellite-based approach. Here we utilized long-term underwater glider data from 2017 to 2025, to obtain the first time-series depth-resolved assessment of NPP on the WFS. The results yielded an annual cumulative depth-integrated NPP of 366 g C m-2 yr-1, more than double the NPP in the more oligotrophic open-ocean Gulf of Mexico. Seasonal variations of depth-integrated NPP were moderate, ranging from 0.6 (January) to 1.4 (September) g C m-2 d-1. 63% of the glider-derived NPP profiles exhibited elevated subsurface NPP, with the highest occurrence during summer (e.g. 98% in June) and the lowest during winter (e.g. 0% in January). Meanwhile, the contributions of NPP below the mixed layer ranged from near zero in January to around 90% in May and June. Such seasonality suggested that light intensity was the major control of vertical structures of NPP in winter when the vertical mixing distributed nutrient evenly throughout the water column. In contrast, the adequate light level and nutrient enrichment below the mixed layer may have led to the elevated subsurface NPP in summer when surface nutrient was depleted during stratification.

Utilization of gliders for Rice’s whale understanding

***Chad Lembke**[1], Melissa Soldevilla[2], Kevin Boswell[3], Bob Currier[4], Megan Howson[4], Héloïse Frouin-Mouy[5], Ashley Cook[5], David Mann[6], Alex Silverman[1], Heather Broadbent[1], Sean Beckwith[1]*

[1]University of South Florida; [2]NOAA SEFSC; [3]Florida International University; [4]NOAA/IOOS/GCOOS; [5]University of Miami; [6]Loggerhead Instruments

The Rice’s whale is one of the most endangered large whales with fewer than 100 animals remaining, all within the Gulf of America. The utilization of gliders for tracking and researching cetaceans is relatively common. At USF we have been applying documented techniques to our glider fleet missions to attempt to augment ongoing research efforts into Rice’s whale activities. A Slocum glider equipped with a passive acoustic recorder, a water column echosounder, and other environmental sensors performed a sentinel transit through the Core Distribution Area recording hundreds of Rice’s whale calls in 2023. In 2025, this effort has been expanded to yearly deployments in the north-eastern Gulf. Here we will present operational efforts including deployment schedules, efforts at enhanced PAM post-processing and real-time detections of Rice’s whale calls, analysis of water column aggregations of prey, and attempts to analyze these data within an ecosystem context.

Characterizing zooplankton communities and maximizing near-real-time information content transfer using ShadowMetrics

***Mark T. Yamane**, University of Washington; John K. Horne, University of Washington*

The WASSOC Shadowgraph can now be deployed as an autonomous optic sensor on underwater gliders. Shadowgraph JPEG images are collected using specified parameters before deployment and stored on a local hard drive. The resulting data volume is too large to transmit through an Iridium satellite and can only be retrieved after deployment. To efficiently characterize zooplankton communities, we developed an onboard processing pipeline and suite of indices, ShadowMetrics, to quantify the number, size, and shape of all objects within each image. Plankton and debris particles are detected through binarization, and outlines of binarized targets are differentiated using watershed segmentation. The pixel area and perimeter of each object is tabulated from the outlines and six additional metrics: equivalent spherical diameter, aspect ratio, circularity, eccentricity, extent, and solidity are calculated using geometric features derived from the outlines. Metric values are tabulated for all detected objects and binned in histograms for summary visualization. Ordination is used to assess the information content of each metric while monocultures of labelled zooplankton images are used to assemble histograms of species-specific ShadowMetric values to evaluate the potential for classification. Use of ShadowMetrics enables transmission of spatially explicit zooplankton community data during glider deployments. These data products can be fused with other biological and environmental data streams to autonomously monitor aquatic ecosystems in near-real-time.

NOAA Fisheries Glider Challenge: Accelerating the use of passive acoustic-equipped gliders to monitor and assess cetacean populations in the Pacific

*Erin M. Oleson[1], **Shannon Rankin**[2], Selene Fregosi[3], Kourtney Burger[4], Anthony Cossio[2], Calla Lloyd-Lim[1], David K. Mellinger[5], Erik Norris[1]*

[1]NOAA Fisheries, Pacific Islands Fisheries Science Center; [2]NOAA Fisheries, Southwest Fisheries Science Center; [3]Marine Mammal Institute, Oregon State University; [4]University of California, Santa Cruz, Institute of Marine Sciences' Fisheries Collaborative Program; [5]Cooperative Institute for Marine Ecosystems and Resources Studies, Oregon State University and NOAA Pacific Marine Environmental Laboratory (PMEL)

Profiling gliders equipped with passive acoustic monitoring (PAM) sensors have been used in several marine mammal monitoring applications, often focused on identifying marine mammal occurrences to understand animal distribution or for threat mitigation. Building on this prior work, the U.S. National Marine Fisheries Service (NMFS) is carrying out a multi-phase effort to accelerate the transition from research and development to operational marine mammal surveys using PAM-gliders in the Pacific. The first phase of this effort was the NMFS glider challenge, launched in Hawaii in January 2026. Concurrent in-water instrumentation testing included Seagliders, the Hefring Oceanscout provided by Cornell University, the Alseamar SeaExplorer, and Teledyne Slocum gliders equipped with DMON, WISPR, and JASCO acoustic sensors. Eight gliders carrying a variety of PAM packages navigated a figure-8 track offshore of Oahu, Hawaii over a 2 week period. The track included multiple phases designed to examine trade-offs between survey design, noise levels, sensor combinations, and piloting and navigation for survey-specific objectives. This "glider rodeo" is one part of an intensive research-to-operations program focused on quickly accelerating NMFS use of uncrewed systems to augment or replace ship-based marine mammal, ecosystem, and fisheries surveys across vast regions of the Pacific where ship surveys are logistically difficult and sustaining the necessary survey frequency is cost prohibitive. This presentation will describe the initial results of the glider rodeo, including basic performance metrics and findings that are guiding NMFS' future investments in PAM-equipped gliders.

Oral Presentations: Payload Engineering and Operational Readiness

In order of appearance in the Workshop Agenda

DAY 2 | May 19 **16:00 - 17:00**

The D-2 Hybrid CTD sensor: Description and evaluation

*John Toole, Alan Fougere, Jeffrey K. O'Brien, **Dean Fougere**: D-2 Incorporated*

A recently-developed oceanographic sensor from D-2, Inc. - named the Hybrid CTD for its novel conductivity sensor and conceived in part to improve the resilience of ocean observing - is described and performance assessments are discussed based on static and dynamic laboratory calibration work. These are complimented by ocean observations obtained by piggybacking sensors on research cruises to the Arctic in 2024 and offshore Bermuda in Spring 2025. Building on an evaluation/development program initiated in 2018, focus here is on the CTD technology established in Spring 2024. The ocean observations were implemented using self-contained controller/data logger/battery units developed for this project; this subsystem is also documented. Based on this study, the Hybrid CTD is judged ready to join the pool of operational sensors used for ocean observation.

Getting the most out of RBR instruments on gliders: Best Practices for RBRlegato^4, RBRlegato^3, RBRcoda T.ODO and RBRtridente

***Mat Dever**, RBR; Jean-Michel Leconte, RBR*

RBR instruments are increasingly deployed on autonomous underwater gliders as part of sustained ocean observing programs. While these instruments offer high-resolution measurements of temperature, salinity, and other key biogeochemical variables, extracting publication-quality data requires careful attention at every stage: from pre-deployment configuration and calibration, through in-situ operation and post-processing.

This talk provides a practical, instrument-focused guide to maximizing data quality from RBR instruments operating onboard gliders. We discuss optimal sensor configuration for different glider platforms and sampling regimes, strategies for minimizing thermal lag and response-time errors in CTD data, and best practices for handling bio-optical and oxygen sensor data. We also highlight common pitfalls encountered during deployment and recovery, and review post-processing approaches, with a focus on correcting dynamic errors.

Sustained pH observations from underwater glider networks in the US

***Benjamin Werb**[1], Yuichiro Takeshita[1], Shawnee Traylor[1], Daniel Rudnick[2], Robert Todd[3], David Nicholson[3]*

[1]Monterey Bay Aquarium Research Institute; [2]Scripps Institution of Oceanography; [3]Woods Hole Oceanographic Institution

Sustained, high spatial resolution subsurface pH observations are critical for assessing current and future ocean acidification impacts in the coastal ocean. However, widespread adoption of glider-mounted pH sensors has remained elusive due in part to limited sensor availability and the heterogeneity of US glider operations. To address this gap, we developed the GliderFET pH sensor, based on the Deep-Sea-DuraFET technology deployed on hundreds of BGC-Argo floats worldwide. The modular design enables straightforward integration onto a variety of autonomous underwater vehicles, and has been integrated onto the Spray, Spray2, and Seaglider. GliderFET sensors are now operating across three sustained glider networks along the US coast: the California Underwater Glider Network, the Trinidad Head glider line, and the Gulf Stream network. Gliders simultaneously measure ancillary parameters, including dissolved oxygen, temperature, salinity, chlorophyll, and currents. This provides critical biogeochemical context for interpreting pH variability driven by processes such as respiration and primary production. Additional carbonate system parameters including pCO2, aragonite saturation state, and dissolved inorganic carbon can also be derived from the pH observations. Since April 2025, the networks have collectively acquired over 3,700 pH profiles to depths of 1,000 m. Real-time quality control, based on BGC-Argo protocols, are currently in development to enable delivery of accurate, actionable data streams in near-real time.

Satellite telemetry for gliders: Present and future capabilities

Jimmy Spore, *Woods Hole Group*

Underwater gliders use a combination of Iridium and Argos satellite telemetry to ensure reliable data delivery and position tracking anywhere in the world. This presentation will explore the satellite constellations behind these systems, the telemetry hardware integrated into gliders, and the associated communication services that enable global connectivity. It will also highlight recent advancements in Iridium and Argos technologies that are enhancing data throughput, geographic coverage, and mission flexibility for autonomous oceanographic operations.

Oral Presentations: Workforce Development & Education

In order of appearance in the Workshop Agenda

DAY 3 | May 20 **14:00 - 14:45**

PLOCAN Glider School: Fifteen years of training and international engagement in ocean glider technology

Carlos Barrera[1], *Andrea Caburlotto*[2], *Alejandro Rueda*[1], *Joaquin Hernandez-Brito*[1]

[1]*Oceanic Platform of the Canary Islands - PLOCAN, Spain;* [2]*National Institute of Oceanography and Applied Geophysics - OGS*

Despite technological developments addressed to ocean-monitoring significantly improved during the last two decades with new platforms, sensors and telemetry systems, there are still many unsolved gaps in terms of data quality, reliability, efficiency and sustainability. Ocean glider technology (including autonomous underwater and surface vehicles) offers a new approach in terms of monitoring capacity and sustainability, enabling it to perform observations in spatiotemporal scales hitherto unavailable.

PLOCAN Glider School is a hands-on ocean-glider technology and training forum mainly addressed to ocean-glider technologies and their wide range of monitoring applications learning. Students and professionals from marine and maritime fields interested in learning about this specific and emerging autonomous ocean vehicle technology are truly welcome to join in. The PLOCAN Glider School is a training action promoted by PLOCAN in line with international programs and projects such OceanGliders, EuroGOOS, AQUARIUS, among others, that provides a state-of-the-art overview and the operational basis approach to this technology through theoretical and practical teaching sessions in both wet-lab and open waters of Gran Canaria.

Leading corporate partners and key-reference research institutions across Europe and USA closely cooperate with the PLOCAN Glider School by teaching some of the didactical program contents, that includes as main topics (for each glider technology) a technology overview, nuts and bolts: how it works, mission setup and piloting, deployment and recovery in open waters, data management and applications, maintenance, etc.

The present work attempts to summarize the role and contribution summary of fifteen years of PLOCAN Glider School where more than two hundred-forty attendees from thirty-six countries of the five continents have been trained, in addition to the support by twenty-eight leading companies (as technology developers in this field) and institutions (as leading operators and end-users), enabling new user groups and the international glider-community growth in support to initiatives such EOOS and GOOS aiming to a more efficient and sustainable global ocean-observing strategy based on this cutting-edge technology.

Training students through repeated seaglider missions: Investigating seasonal dynamics in Puget Sound

***William Menapace**, Catherine Holman, Ayden van den Berg, Sasha Seroy: University of Washington*

The Student Seaglider Center (SSC) is a student-run lab in the University of Washington's School of Oceanography focused on conducting novel research using underwater gliders. Students collaborate across three teams (Science, Technical, and Business) and engage in all aspects of the research process from securing funding to planning and executing missions to presenting findings. This structure enables students to develop necessary skills and real-world experience for careers in ocean science and technology. As a student-run lab, standardized training is important to onboard new members and retention of institutional knowledge is critical due to high turnover as students graduate. Puget Sound serves as an optimal location to conduct regular glider missions given its high temporal and spatial variability, need for environmental monitoring, and its accessibility to the SSC. To address this need, and support consistent student training we developed the UW OTTERS (Ocean Tech Time Series using Experimental Research Seagliders) mission which occurs twice a year in the summer and winter for two weeks each. Students manage deployments and pilot gliders along east-west transects in the main basin of Puget Sound. Through OTTERS, the SSC has investigated seasonal changes in tidally-forced stratification patterns. Findings from the first year of observations suggest seasonal shifts control water column density patterns and tidal phases influence water column profiles particularly in winter. We also observed the strongest stratification in summer. This dataset will provide context for future environmental changes within Puget Sound, including supporting regional models and forecasting how conditions may be impacted by climate change. Continuing the OTTERS missions will also enable the SSC to integrate new members and collect time series data to support the scientific community and student research projects. Analysis of the student experience indicates that the SSC effectively builds career-relevant skills and supports students' career trajectories in the blue economy after graduation.

Building an ocean technician workforce using microcredentials

***Liesl Hotaling**, Marine Technology Society*

There is a global need for skilled workers across multiple sectors within the marine industry. To prepare this workforce, we must collectively take action to establish attractive, innovative, agile and equitable educational opportunities. These opportunities should capitalize on skill sets for a range of workers and encourage engagement pathways for life-long learning through obtaining stackable microcredentials and professional certificates to promote personal growth, keep pace with technological changes, and capitalize upon opportunities within the sector.

To address this need, the Marine Technology Society (MTS) is producing stackable microcredentials to create accessible and flexible pathways to learning and vocational training. The microcredentials address core competencies required for employment in the blue economy. These flexible learning pathways will be of value to a spectrum of learners including those: entering the workforce; looking to apply skill sets acquired during military service; seeking acknowledgement of skills acquired "on the job"; and in need of employment retraining. The cross training/upskilling provided through the microcredentials framework is intended to form workers capable of generating innovation and new applications and/or refinements of existing technology, and development of new technologies.

Microcredentials Review teams, composed of representatives from academia, industry, military and government, are working to benchmark the competencies required to obtain the Fundamental, Intermediate and Advanced credentials for a range of topics and marine technologies. To launch the program, Fundamental microcredentials for sonar, ROVs and gliders (hardware and software), Deck Ops and Prototyping were created and vetted by the committees and currently are being earned by learners.

As materials for the Intermediate and Advanced microcredentials for gliders are developed and seeking local providers for implementation, MTS will partner with several institutions to implement the Foundational, Intermediate and Advanced skills training locally.

Learners will receive a badge/credential in partnership with the school and MTS. MTS will issue the electronic badges directly to the learners for inclusion in their resumes, LinkedIn profiles and other social media, and will recognize skills and abilities in addition to traditional degrees.

Oral Presentations: Data Infrastructure and Interoperability

In order of appearance in the Workshop Agenda

DAY 3 | May 20 **15:15 - 16:00**

Next generation data systems for the California Underwater Glider Network

***Jenn Sevadjian**, Daniel Rudnick, Ben Reineman, Jeffrey Sherman, Miguel Cubilla: Scripps Institution of Oceanography*

The robust data systems that support the California Underwater Glider network (CUGN) Spray glider fleet have developed over the past 20 years. The next generation of Spray gliders is now online with a host of new capabilities and our growing long-term data records are enabling the development of additional climatology products. Within the California Underwater Glider Network, Spray2 gliders are collecting and telemetering more data, from more sensors and sensor types, with more complex sampling patterns than were possible previously. As a result, the data systems to support these advancements are also making a leap forward. Nearly all aspects of CUGN data systems are being updated and expanded including piloting interfaces, ground station systems, real-time data pipelines, and downstream data products. The latest data management best practices like international OG-1.0 guidance are being incorporated early in new data pipelines and will enhance interoperability to a variety of product offerings. We also now have long enough records to offer additional climatology data products including a dissolved oxygen climatology for the CUGN.

Gliding clearly: The role of open-source and non-academic actors in global ocean glider data

***Aaron Mau**, Callum Rollo, Martin Mohrmann, Louise Biddle: Voice of the Ocean Foundation*

Ocean gliders are distinct from other autonomous platforms in that they offer more mobility and vertical resolution than a mooring, more intent than a float, and more economy than a research vessel. As ocean observations become more and more important to constrain models and inform policy, it is increasingly important to have high-quality data products available.

However, methodologies and technologies differ from group to group and are not always transparent, complicating the usage of data that seeks to be findable, accessible, interoperable, and reusable (FAIR). Establishing standards requires frameworks and guidance, which in turn, requires specific funding that is not always available.Here, we present projects that the Voice of the Ocean Foundation (VOTO) is involved in, including in-house tools and support for the global community. The VOTO Glider Dashboard tool is a fast interactive online tool to visualize glider observations, capable of loading over 200,000 profiles and stitching individual glider missions together to easily visualize timeseries, individual profiles, and scatter diagrams. Global Data Assembly Center (GDAC) compatibility allows the usage across a wide range of local working groups and glider models. In aiding the OG1 standardized glider format, VOTO has also developed a repository of controlled vocabularies to standardize numerous sensors and variables and map them to the Natural Environment Research Council's Vocabulary Server (NVS). These projects are helping VOTO support the community's path towards interoperability, in both visualizing and sharing observation data collected regardless of glider type. Through open collaboration and public projects, we present the role that non-academic parties can play in strengthening the international gliders community.

Configurable QARTOD quality control for environmental variables: A data-driven, JSON-based approach for GDAC submissions

Leila Bagdad Brahim[1], *Adams Benjamin*[1], *Donald Moretti*[1], *Sarina Mann*[2], *Kathleen Bailey*[3]

[1]Tetratech; [2]NOAA Affiliate; [3]NOAA Federal

As the demand for robust quality assurance and quality control (QARTOD) of oceanographic data increases, it is essential to provide clear, configurable, and reproducible methods for a wide range of environmental variables. We present a flexible approach that leverages Climate and Forecast (CF) standard names to identify and describe measurement variables in ocean observing datasets. To facilitate automated QARTOD testing, we have developed JSON configuration files that specify variable and attribute names, as well as the methods and thresholds used for each QARTOD test.

Our methodology employs data-driven statistical techniques to determine test thresholds, including percentile-based cutoffs and calculations based on the mean and standard deviation of observed values. For example, gross range test suspect spans and fail spans are set using empirical percentiles and fixed physical limits, while spike, flat line, and rate of change tests use thresholds derived from the distribution and sampling characteristics of the data. This ensures that QARTOD flagging is both adaptive to the specific dataset and transparent in its methodology.

By encapsulating these settings in JSON files, we enable automated, reproducible QC workflows that can be easily adapted for different variables or evolving standards. This supports the GDAC community's goal of expanding and standardizing QC processes, ultimately improving the reliability and accessibility of high-quality oceanographic data products.

Posters

In alphabetical order by presenting author's last name. Posters with a bolt (⚡) feature Lightning Talks.

⚡ Mesoscale ocean dynamics in the Caribbean: Insights from the RU-29 autonomous glider

Xinara Bascombe, *David Farrell, Joe Gradone, Scott Glenn, Travis Miles: Caribbean Institute for Meteorology and Hydrology, Center for Ocean Observing Leadership, Department of Marine and Coastal Sciences Rutgers University, and The University of the Virgin Islands*

Ocean glider RU29 forms part of the international Challenger Mission aimed at establishing a network of autonomous platforms to collect real-time oceanographic data across the Caribbean. Equipped to measure temperature, salinity, dissolved oxygen, and velocity data to depths of 1,000 m, RU29 was deployed between Barbados, Guyana, and Trinidad and Tobago from 14 July to 15 October 2025. This study aims to investigate the influence of North Brazil Current Rings (NBCRs) on regional ocean water mass structure. Glider observations were compared with background temperature and salinity fields from Copernicus Marine Environment Monitoring Services' numerical ocean model. Results reveal notable differences between observed and modelled temperature profiles, indicating the influence of mesoscale ocean dynamics. Both anticyclonic and cyclonic eddy structures were identified within the dataset, affecting vertical temperature distribution. A total of five eddies were detected, comprising two anticyclonic and three cyclonic eddies, each exhibiting distinct lifespans and trajectories. These findings demonstrate the value of autonomous glider observations in resolving mesoscale processes and improving understanding of ocean variability in the Caribbean.

OceanGliders: Two decades of progress in global glider deployments

***Mariarita Caracciolo**: OceanGliders*

The poster presents an overview of the OceanGliders programme, highlighting progress in global glider deployments and network development over the past two decades. Currently, if we consider the last 5 years, approximately 386 glider missions are conducted annually, with an average of 1211 glider days at sea every month and 40 gliders operating daily, reflecting steady growth in both activity and international participation. The programme is supported by 25 countries, with strong contributions from the United States, Europe, Australia and Canada, while significant observational gaps remain in regions such as the Western Pacific and Indian Ocean. Since July 2025, the network has undergone a major realignment to strengthen governance, data management, and its contribution to GOOS, including new leadership, revised Terms of Reference, the establishment of a permanent Data Management Team, and the definition of three core observing missions (boundary, open ocean, and polar). In parallel, efforts toward standardisation have advanced through the continuous update of the OG1.0 framework and the development of controlled vocabularies, while improving data integration, metadata tracking and enhancing monitoring capabilities via OceanOPS. The increasing diversity of sensor payloads and mission duration and the expansion of operating agencies demonstrate the growing complexity and operational capacity of the network, while also highlighting challenges in coordination and data harmonisation. Looking ahead, OceanGliders aims to reach an ambitious 2030 target of 100 gliders operating continuously throughout the year. Achieving these goals will require improved global engagement, sustained funding—particularly for technical coordination—and the development of key performance indicators to better guide implementation. Addressing regional imbalances and advancing interoperable, federated data systems remain critical priorities for the continued evolution of the network.

Glider observations around BATS: MAGIC and beyond

***Jonny Chapman**, Alice Ren*

Glider observations have been made around the Bermuda Atlantic Time Series (BATS) since 2015 as part of the Mid-Atlantic Glider Initiative and Collaboration (MAGIC). Here, we summarize observations over the past 10 years and describe plans for the next 4 years. MAGIC glider deployments were conducted around Bermuda in proximity to Hydrostation "S" and BATS providing year-round observations. Data were collected for different process studies, varying from hurricane deployments to spring bloom monitoring, accumulating more than 7 years of glider time at sea, with most deployments being 60 days or less. Around BATS, the annual cycle of potential temperature, salinity, potential density, dissolved oxygen, particulate optical backscattering coefficient, and chlorophyll fluorescence is calculated. Using the optical data and established methods, we make an estimate of the annual cycle of particulate organic carbon. In the next four years, gliders will monitor a transect from Bermuda to BATS to Spatial Station 22, measuring horizontal variability in physical and biogeochemical variables.

Investigating Slocum glider lithium rechargeable battery health and performance

***Karen Dreger**, Joshua Soll, Catherine Edwards: Skidaway Institute of Oceanography*

Tracking battery cell use and performance before and after missions and over time can improve estimates of maximum mission duration. This project investigates historical battery cell health data trends using available data from rechargeable lithium batteries used in the Skidaway and SECOORA Slocum glider fleets. Individual battery cells will be evaluated in time, as well as the relationship between battery capacity and performance. Finally, best-practice procedures will be suggested for extracting and documenting these data to support long-term monitoring of cell health.

Real time monitoring of North Atlantic right whales in the Southeast US calving ground

Catherine Edwards *(absent): Skidaway Institute of Oceanography*

Critically endangered North Atlantic right whales experience high mortality rates due to ship strikes and entanglement in fishing gear. These anthropogenic mortalities occur across the right whale habitat, including the northern foraging grounds, the Mid-Atlantic Bight migratory corridor, and the Southeast US calving ground off the coasts of South Carolina, Georgia, and Florida. A significant Unexpected Mortality Event beginning in 2017 has motivated the use of dynamic right whale management, a strategy that changes management based on near-real time visual and/or acoustic monitoring. Despite the expansion of glider-based passive acoustic monitoring efforts and studies on the efficacy of this approach in right whales' northern foraging grounds, acoustic monitoring is much more limited in the migration corridor and the Southeast US calving ground. Shallow water depths (<20m), strong tides, and temperature/salinity gradients on the inner shelf can make glider operations challenging, and also shape our ability to detect these animals acoustically. Data from missions conducted off the Georgia and north Florida coast from 2023-2026 are used to describe tradeoffs between glider flight performance and acoustic monitoring performance, methods to reduce glider self-noise and false detections, and identify environmental factors that control performance and potentially be leveraged to optimize performance and design future efforts.

⚡ When is a glider not a glider? When it's legally a ship!

Cassandra Elmer*, Eleanor Haigh, Jasmin McInerney, Jacob Hall, Jim Drury: ESNZ; Nina Heatley: Clever Fox Projects*

As autonomous aquatic vehicles become more prevalent for both casual and scientific users, governments are developing legal frameworks to ensure that any risks to the safety of people, other vessels, and the environment are adequately addressed. The Maritime Transport Act 1994 (the Act) provides this legal framework in New Zealand. The Act applies to "every description of boat or craft used in navigation, whether or not it has any means of propulsion" and specifies duties of participants involved in maritime activities. Maritime New Zealand (MNZ) is responsible for enforcing the Act. MNZ is one of the first to define autonomous underwater gliders as ships under Maritime Rule Part 40G, which applies to Novel Ships such as submarines and uncrewed aquatic craft. Earth Sciences New Zealand (ESNZ, formerly NIWA) operates two Teledyne Slocum G2 gliders that fall under this Rule. To comply with the Rule, our gliders need surveys, design approvals, boat registration numbers, maintenance plans, and safety plans. These procedures and records will be subject to review and audit, and many approval documents that were written with surface vehicles (with higher risk to mariners) in mind need exceptions. In addition, our pilots must undergo training and certification in maritime law and safety, and a Remote Master must take legal responsibility and command of the glider during each mission. New Zealand has gone through this process, and it is looking increasingly likely other countries may follow suit.

Shadowgraph: Subsea Telecentric Imaging System

Caleb Flaim*, Matthew Green, Freshy Millsap, Rob Millsap, Max Schlereth: Williamson and Associates Technologies (Wassoc)*

Zooplankton communities play a central role in marine ecosystems, yet their fine scale spatial and temporal dynamics remain difficult to quantify using traditional sampling methods. Quantifying zooplankton geo-temporal patterns traditionally requires expensive time at sea, where net tows are performed to capture biological samples for later classification and enumeration. This traditional sampling method can be spatially limited due to ship operational and financial limitations and oftentimes damage delicate samples. We present SGV3, the most recent revision of Shadowgraph, a subsea telecentric imaging system. SGV3 captures monochrome silhouette imagery of zooplankton by shining an RGB-configurable diffused backlight through a 200.8 cc water column toward a 2.2 MP global shutter image sensor Images are captured at depths up to 1000 m with a 100 µs minimum shutter speed, 20 Hz raw image capture rate, and a resolving power >100 µm (11 LP/mm), all stored on a 2TB hard drive. SGV3 is designed to run nominally at 2 W with 5–25 VDC input voltage, utilizes a UV-C anti-biofouling light, and is controlled over RS-232. This glider-borne system enables in-situ zooplankton photography and machine learning data pipelines.

Passive acoustic gliders as a complement to ship-based marine mammal surveys

Selene Fregosi[1,2], *Shannon Rankin*[3], *David K. Mellinger*[4], *Erik Norris*[2], *Calla Lloyd-Lim*[2], *Megan Wood*[5], *Kourtney Burger*[3,6], *Anthony Cossio*[3], *Jen Walsh*[3], *Erin M. Oleson*[2]

[1]Marine Mammal Institute, Oregon State University; [2]NOAA Fisheries, Pacific Islands Fisheries Science Center; [3]NOAA Fisheries, Southwest Fisheries Science Center; [4]Cooperative Institute for Marine Ecosystems and Resources Studies, Oregon State University and NOAA Pacific Marine Environmental Laboratory (PMEL); [5]Saltwater, Inc., contracted to NOAA Pacific Islands Fisheries Science Center; [6]University of California, Santa Cruz, Institute of Marine Sciences' Fisheries Collaborative Program

Buoyancy-driven underwater gliders equipped with passive acoustic recorders are an increasingly important tool for marine mammal monitoring. Gliders can operate year-round, access remote offshore regions, and collect high-frequency recordings suitable for detecting most marine mammal species. As a result, the U.S. National Marine Fisheries Service is working to use passive acoustic monitoring (PAM) gliders to augment traditional ship-based visual and acoustic surveys in the Pacific. A key step in this application is understanding how glider-based acoustic observations relate to detections made during conventional shipboard surveys. To support this effort, multiple deployments have been conducted to coincide with large-scale ship-based marine mammal surveys. In fall 2024, three PAM gliders surveyed more than 3,000 km over 145 survey days along the U.S. West Coast, overlapping in time and space with a portion of a ship-based marine mammal abundance survey off Oregon and California. Similarly, in winter and spring 2026, five PAM gliders conducted deployments of up to 12 weeks throughout the Main Hawaiian Islands concurrent with a ship-based survey. These coordinated efforts provide a unique opportunity to evaluate how glider-based PAM can complement traditional survey methods while expanding spatial and temporal coverage. This presentation will describe the survey design, operational coordination between glider and ship platforms, and the broader effort to incorporate glider-based PAM into sustained marine mammal monitoring programs in the Pacific.

Advancing glider passive acoustic monitoring for cetacean baseline data and impact assessment in the U.S. Caribbean

Héloïse Frouin-Mouy[1], *Doug Wilson*[2], *Joshua Soll*[2], *Keiley Gregory*[2], *Travis Hamlin*[2], *Travis Miles*[3], *Matthew Bowers*[4], *Lance Garrison*[4], *Melissa Soldevilla*[4]

[1]University of Miami, Cooperative Institute for Marine and Atmospheric Studies; [2]University of the Virgin Islands, Center for Marine and Environmental Studies; [3]Rutgers University, Center for Ocean Observing Leadership; [4]NOAA NMFS SEFSC, Marine Mammal and Turtle Division

The U.S. Caribbean supports an estimated 20–27 species of tropical cetaceans, yet their occurrence and distribution around Puerto Rico and the U.S. Virgin Islands (PR-USVI) remain poorly documented. As industrial development and maritime activity increase in the region, there is a growing need for robust baseline data on cetacean diversity, distribution, and seasonality to inform marine spatial planning and environmental impact assessments. Passive acoustic monitoring (PAM) is a powerful tool for confirming the presence of cetaceans in the vicinity of recording devices when visual monitoring is not feasible. Uncrewed systems (UxS), such as gliders offer an emerging, cost-effective platform to extend the spatial and temporal reach of PAM. Although proven in research contexts, PAM-equipped gliders have not yet been widely adopted for NOAA operational surveys. Initiated in 2024, this project aims to address that need by exploring glider-based survey approaches to support NOAA Fisheries' marine mammal surveys and research operations. In collaboration with the University of the Virgin Islands (UVI), eight glider missions were conducted between August 2024 and March 2025 along the north and south coasts of Puerto Rico and around the USVI. Slocum gliders equipped with DMON2 passive acoustic recorders were used to monitor cetacean presence. Missions lasted 18–33 days (0-23 acoustic days) and covered 256–582 km. The gliders followed vertical zigzag patterns in the water column, from the surface to depths determined by local bathymetry and desired mission duration, reaching up to 900 m. Low-Frequency Acoustic datasets were analyzed using the Low-Frequency Detection and Classification System (LFDCS) and MinkeNet algorithms for baleen whale detections, and PAMGuard for odontocete detections. For baleen whales, seasonality was observed: humpback and minke whales were detected in late winter and early spring 2025 but not during late summer and fall 2024. For odontocetes, several

species or species groups were recorded around PR-USVI, including sperm whales, Kogia spp., pilot whales, goose-beaked whales, Gervais' beaked whales, the BWG (Beaked Whale Gulf, an unknown beaked whale species), and several unidentified delphinid species. Starting in 2026, we are expanding capacity by conducting seasonal, concurrent glider-based PAM missions near the shelf and off-shelf waters (>1000 m) around PR-USVI, and by deploying four fixed autonomous acoustic recorders in shallower waters around the USVI for 2 years. Current and future datasets are critical for assessing potential impacts of industrial development on cetaceans while advancing NOAA's operational capabilities for long-term stock assessment and ecosystem monitoring in the U.S. Caribbean.

Optimization of passive acoustic data collection from autonomous underwater gliders

Cordielyn Goodrich[1], *Thomas Altshuler*[2], *Shea Quinn*[1], *John Moloney*[3], *Andrew Gelder*[2], *Michael Brissette*[1], *Brad Joseph*[1], *Ben Anthony*[1]

[1]Teledyne Webb Research, North Falmouth, United States; [2]Teledyne Marine, North Falmouth, United States; [3]JASCO Applied Sciences, Dartmouth, Canada

The Slocum G3S Glider is a buoyancy-driven autonomous underwater vehicle capable of carrying a variety of sensors that perform physical, biological, and chemical oceanographic data collection to serve multiple industries and applications. The Slocum G3S Glider has become a staple in long-endurance autonomous oceanographic sampling. The Slocum G3S Glider is especially well suited to carry Passive Acoustic Monitoring (PAM) sensors due to its low operational noise floor and ability to remain in situ for months at a time. A multiyear case study of Slocum Glider Passive Acoustic Sensing was conducted West of Portugal, at the mouth of the Setúbal Canyon, from 2021 to 2025. In September of each year, gliders outfitted with PAM sensors were deployed for 3-4 weeks collecting ambient noise measurements and listening for acoustic targets. Engineering and operational improvements were made in the hardware, software, near-real-time data telemetry, or concept of operations throughout this case study to optimize passive acoustic data collection on autonomous systems. This case study provides a rich data set for understanding passive acoustic data collection on Slocum G3S Gliders. It additionally highlights that as passive acoustic monitoring on underwater vehicles becomes more prevalent, the use of platforms - like the Slocum G3S Glider - that are optimized for this type of data collection result in higher quality data and valuable near-real-time results.

Hands on with AQUAVIEW and the AQUAVIEW API

Joshua Hill: *Institute for Advanced Analytics and Security*

AQUAVIEW makes it easier to discover, subset, and work with ocean observing data at scale, including underwater glider observations. This hands-on session will walk participants through practical workflows for finding relevant glider deployments, exploring variables and metadata, and extracting subsets suitable for analysis and visualization. We will then transition from the web application to the AQUAVIEW API, showing how to reproduce the same queries programmatically to support automation, repeatable pipelines, and integration into existing science and operations tooling.

Participants will leave with a clear mental model of how AQUAVIEW organizes glider data, how to validate data selections quickly in the UI, and how to translate those selections into API requests for scripted downloads and downstream processing (for example in Python or other common environments). The session emphasizes real-world patterns such as filtering by time, geography, platform, and parameter, handling large result sets, and building shareable, reproducible query recipes that colleagues can rerun without ambiguity.

Attendees are encouraged to bring a laptop. No prior AQUAVIEW experience is required, but basic familiarity with working with oceanographic datasets and REST-style APIs will be helpful.

ϟ World Ocean Database: Building a search engine for 200 years of ocean data

*Safak Yamali, **Pappu Jha**, Bibas Kandel, Abhiyan Poudel, Joshua Hill: The University of Southern Mississippi*

The World Ocean Database (WOD) is the world's largest and most comprehensive collection of publicly available oceanographic profile datasets, maintained by the National Oceanic and Atmospheric Administration (NOAA). It is stored in an AWS S3 bucket in NetCDF (.nc) format for the year 1800 and for the years 1900 to 2024. For each year, there are several instrument types, such as OSD and APB, each with its own NetCDF file. Inside the file, there are several profiles, ranging from a few thousand to hundreds of thousands, providing data on variables like temperature, salinity, and oxygen. Due to the dataset size of more than 200 GB and heterogeneous instrument types, it has been a major challenge for researchers to discover the required data in time. Therefore, we present a three-phase pipeline that delivers raw NetCDF files from the S3 bucket to the customers in a user-friendly manner in real-time. The first phase involves transferring NetCDF files from the S3 bucket to Google Cloud Storage using the Storage Transfer Service. Next, phase 2 ingests NetCDF files into an Icechunk repository. Lastly, phase 3 extracts cruise-level metadata by aggregating millions of individual profiles into 250,000 STAC items. The resulting catalog allows users to make queries based on temporal and spatial filters via Elasticsearch in seconds. In addition, we implement another important feature called WOD Chat for faster data accessibility. It is a natural language interface using LangGraph agents that queries the Icechunk dataset and returns the required WOD data in a conversational manner. Our work on the World Ocean Database is available on aquaview.org.

ϟ Ocean observations for hurricane prediction in 2025 from multiple platforms

***Matthieu Le Henaff**, NOAA AOML; L. Looney, G. Foltz, C. Stienbarger*

Tropical Cyclones (TCs) draw much of their energy from the ocean. The ocean state, in particular the Sea Surface Temperature and the vertical structure of the ocean below the TC, affects the storm's intensity and its evolution. In order to improve our understanding of the air-sea interactions under a TC, and to provide critical ocean observations to operational centers responsible for hurricane forecasting, NOAA/AOML and regional partners have been deploying, since 2014, ocean gliders in the Caribbean region where many Atlantic hurricanes are known to pass and intensify. Since 2021, NOAA/AOML and partners have also deployed Uncrewed Surface Vehicles (USVs), which collect observations just above and below the air-sea interface, allowing the characterization of air-sea interactions under extreme TC conditions like never before. In 2025, AOML gliders collected data under two major hurricanes, Erin and Melissa, and these data were used in real-time by the National Hurricane Center (NHC) forecasters to adjust their predictions. In parallel, a new model of USV, the Oshen C-Star was successfully tested, with 8 vehicles deployed and 9 storm intercepts. Like the glider data, data from the C-stars were assimilated into NOAA's operational models, and also used in real-time by NHC forecasters. Although, unlike previous seasons, gliders and USVs were not co-located in 2025, other observation platforms, such as dropsondes and wave drifters, were deployed from the NOAA P3 aircrafts near gliders and USVs during some of the storm intercepts, thanks to NOAA's Coordinated Hurricane Atmosphere Ocean Sampling (CHAOS) effort. We will present this collective effort and the associated results.

Lessons from Stony Brook's growing glider program

***Matthew Learn**, Charlie Flagg, Jacqueline McSweeney: Stony Brook University*

Stony Brook University operates a Slocum glider program focused on repeat seasonal sampling of the New York region of the Mid-Atlantic Bight shelf, which is a highly dynamic coastal environment. The program maintains a fleet of three gliders and conducts multiple deployments per year, with missions planned to capture key seasonal transitions while balancing scientific objectives against platform availability and maintenance constraints. The program is supported by multiple funding sources, including the New York State Department of Environmental Conservation (NYDEC), the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS), and, at times, the New York State Energy Research and Development Authority (NYSERDA), each with distinct observational priorities. To accommodate these demands, the glider fleet has been configured with a largely standardized sensor suite, measuring temperature, salinity, dissolved oxygen, chlorophyll A fluorescence, optical backscatter, pH, and passive acoustic recordings from Digital Acoustic Monitoring (DMON) instruments. Operating a small fleet in shallow-water environments has introduced challenges that directly affect deployment cadence and data continuity. These include elevated power consumption associated with high-displacement buoyancy pumps in shallow water, extended turnaround times for pH sensor calibration, and shortened maintenance intervals driven by increased actuation cycles. As a result, the program has rarely had all platforms operational simultaneously, requiring adaptive planning to meet observational goals. Despite these constraints, deployments have produced a growing multi-year record that resolves inter-seasonal variability, including transitions from well-mixed winter conditions to springtime stratification and bloom development, persistent summer stratification with pronounced subsurface structure, and fall erosion driven by atmospheric forcing. Together, these experiences highlight how fleet configuration and maintenance constraints influence deployment strategies in small, multi-mission glider programs.

ϟ From glider missions to model-ready data: Building repeatable pipelines for novel ocean observations

Daniel Amrhein[1], Georgia Coward[2], Nate Crossette[3], Helen Kershaw[1], Scott Landolt[1], ***Enrico Milanese**[4]*, *Nicholas Rome[2], Travis Sluka[3]*

[1]NSF National Center for Atmospheric Research; [2]UCAR Center for Ocean Leadership; [3]Joint Center for Satellite Data Assimilation; [4]Woods Hole Oceanographic Institution

Modern autonomous ocean observing systems like glider missions generate dense, multi-platform measurements, offering new opportunities for process studies and data assimilation into numerical models. However, heterogeneous formats and delivery mechanisms hinder the integration of these observations into existing scientific workflows. Here I will describe an upcoming community workshop aimed at accelerating data dissemination for novel observing platforms using CrocoLake, a cloud-optimized, analysis-ready database of in situ ocean observations from diverse networks. In addition to hosting observations, CrocoLake is a community platform for repeatable pipelines to connect observational data with downstream use cases, including modeling, data assimilation and forecasting. I will present the workshop's proposed structure and goals and seek feedback from the UG2 community to ensure the workshop supports your needs in making your data more accessible.

ϟ The Slocum Sentinel Glider: Facing the challenges of tomorrow with an increased capability buoyancy-driven autonomous vehicle

***Shea Quinn**, Cordielyn Goodrich, Clayton Jones, Anthony Westphal, Salvatore Fricano, John Volpe, Ben Anthony, Garrett Miller: Teledyne Webb Research*

The Slocum Glider has been a pioneer in oceanographic autonomy for the last two decades - a buoyancy-driven, long-endurance, autonomous underwater vehicle (AUV) capable of carrying a variety of sensors that perform physical, biological, and chemical oceanographic data collection to serve multiple industries and applications. As this technology has grown and become a reliable platform for measuring the ocean, the need for it to be able to support larger and more energy intensive payloads, longer endurance missions, and increased flight speeds has become clear. The Slocum Sentinel Glider was designed to fill these gaps – a new type of buoyancy-driven AUV with the same efficiency as the Slocum G3S, but with three times as many batteries, 4 times the amount of volumetric displacement, and 1.5 times the speed. The Slocum Sentinel Glider provides a solution to sampling the ocean in a way not possible by other buoyancy-driven AUVs or traditional propeller driven AUVs. This autonomous system will open new frontiers for ocean monitoring and research - supporting the power and processing needs of the next generation of oceanographic sensors, autonomously reaching areas of the ocean that were not possible before, and facilitating continuous data collection for extended timeseries. This case study steps through the enhanced capabilities of the Slocum Sentinel Glider and the ways in which these technologies can be used in service of biology and fisheries, deep physical oceanography, widescale and rapid response passive acoustic monitoring, and critical subsea protection.

Documenting cross-basin transport in the north Indian Ocean through glider observations

***Saraswathy Sabu**, Abhisek Chatterjee, N Suresh Kumar, Aneesh Lotliker, E Pattabhi Rama Rao: NCOIS, Hyderabad, India*

The Arabian Sea (AS) and the Bay of Bengal (BoB), two tropical basins separated by the Indian Peninsula, show marked contrast in their water mass properties. While the AS is characterised by its dense water mass formations (relatively cold and salty Arabian Sea High Salinity Water (ASHSW)), the BoB exhibits fresher, highly stratified upper water column. The inter-basin connection between the AS and the BoB keeps these two basins in a quasi-steady state. However, documentation of these cross-basin transports is very sketchy owing to the lack of systematic observations. As part of the Deep Ocean Mission (DOM), Indian National Centre for Ocean Information Services (INCOIS) has conducted 11 glider missions during 2021-2025 each spanning 3–9 months and covering multiple seasons while traversing from ~5°S to 17°N along 67°E in the AS and 89°E in the BoB. Our analysis shows that in the AS, the subsurface salinity maxima with a density range of 2023-2024.5 kg/m3 at around 50-100 m depth is prominent only south of 8oN during winter, indicating the presence of ASHSW in the southcentral AS. North of 8oN, the high-salinity surface water extends below 100 m depth, and no subsurface salinity maxima is evident. The existence of this ASHSW can be traced in the southern BoB south of 6oN during fall, providing crucial observational evidence of the ASHSW transport from the AS to the BoB, likely advected by the summer monsoon currents. Additionally, a distinct salinity minima with a salinity of ~34.5 psu, collocated with increased concentration of DO, in the depth range of 200-600 m south of 8oN is observed. These subsurface minima (maxima) of salinity (DO) can also be traced in the eastern part of the equatorial Indian Ocean. This is likely to be the first observational evidence of subsurface ventilation of low-salinity, high-oxygenated water into the Arabian Sea from the southern hemisphere of the tropical Indian Ocean.

⚡ Investigating the oceanic variability of coral reefs in the US Virgin Islands on a shallow to mesophotic gradient

***Cole Sheeley**, Doug Wilson, Tyler Smith, Travis Hamlin*

The coral reefs of the insular shelves and surrounding slopes of the US Virgin Islands have a complex biophysical environment. The water column contains seasonally strong thermoclines and pycnoclines at mesophotic depths (30-150 meters), leading to a strong gradient of physical properties with implications of coral reef development and response to disturbance. We used benthic temperature records of 43 sites, a thermistor string deployment along the Grammanik shelf slope, and a 200 m TWR Slocum glider to investigate the variability across years, seasons, depth, and their potential oceanic drivers. Temperature records were collected by the Territorial Coral Reef Monitoring Program covering over 20 years. The glider, UVI02, was deployed by the University of the Virgin Islands Ocean Glider Lab in November 2023-24 and February 2024, collecting measurements offshore of the St. Thomas shelf near the Grammanik Bank.

Across benthic coral reef sites at a range of depths from 6m to 100m, mean temperatures were found to be increasing steadily, based on continuous measurements. Annually, temperatures generally showed warm peaks from September to November and cold peaks from January to March. Higher frequency temperature variability was strongest at depths near or below the seasonal mixed layer depth, with a strong semidiurnal frequency peak. Glider profiles just offshore of the Grammanik Bank mesophotic coral reef found strong semidiurnal internal waves causing periodic temperature variability below the mixed layer of up to ± 2 degree Celsius and ± 2 Salinity units. Glider profiles also revealed chlorophyll maximum and dissolved oxygen minimum layers at mesophotic depths around 50m. Evidence of these internal tides are seen at varying amplitudes at regional mesophotic reef sites and can provide cooling during warming periods and may help alleviate thermal stress.

Assessing baleen whale species composition, diel patterns, and habitat preferences in the USVI and Puerto Rico using PAM-equipped Slocum gliders

Joshua D. Soll[1], ***Keiley Gregory***[1], *Doug Wilson*[1], *Héloïse Frouin-Mouy*[2], *Melissa Soldevilla*[3]

[1]Center for Marine and Environmental Studies, The University of the Virgin Islands, St. Thomas, U.S. Virgin Islands; [2]Cooperative Institute for Marine and Atmospheric Studies (CIMAS), University of Miami, Miami, Florida; [3]NOAA Southeast Fisheries Science Center, Key Biscayne, Florida

Autonomous underwater vehicles equipped with passive acoustic monitors can expand baleen whale monitoring in data-limited regions such as the eastern Caribbean, which is utilized as a mating and calving ground in the winter and spring. We conducted eight seasonal missions with DMON2-equipped Teledyne Slocum gliders around the U.S. Virgin Islands and Puerto Rico to establish baseline data on baleen whale detectability, occurrence, diel calling patterns, and habitat use. During Missions 6 and 7, we detected humpback (Megaptera novaeangliae), common minke (Balaenoptera acutorostrata), and possible sei whales (Balaenoptera borealis). Only humpback and minke whales had sufficient data to proceed with statistical analysis. Using regression and circular statistics on hour-binned detections, both species showed peak calling near midday, with some variation among missions and analytical tests. Mapping detections along glider tracks indicated that both species primarily used waters off the shelf and near the shelf break. In Mission 6, there was a significant positive effect of depth on the probability that a whale call would be detected for both species ($p < 0.01$; to the mission's maximum depth of ~500 m), suggesting deeper sampling improves detection probability along shelf edges. These results provide baseline spatiotemporal calling data for baleen whales in the eastern Caribbean and represent an early field test of the MinkeNet automated detector in the region. This work supports NOAA's regional monitoring objectives and informs survey design, including timing and depth targeting, as well as efforts to mitigate acoustic impacts during future offshore wind development.

ϟ Lessons learned from a year of operating underwater gliders in the Northern Gulf of Alaska

Hank Statscewich*, University of Alaska Fairbanks; Seth Danielson, Tyler Hennon, Thilo Klenz, Isaac Reister, Jenny Grischuk, Kate Hedstrom, Lydia Sgouros*

Over the past two decades, autonomous underwater gliders have become a vital component of ocean observing systems, offering high-resolution vertical profiling over missions that can span more than 1,000 km and 100 days. In spring 2024, oceanographers at the University of Alaska Fairbanks (UAF) launched the Glide-365 mission, with a goal of operating autonomous underwater gliders continuously for a full calendar year at a mid-shelf site in the Northern Gulf of Alaska (NGA). The project aimed to collect environmental data for addressing scientific questions of this energetic shelf but also to evaluate the feasibility of sustained, overlapping glider deployments under challenging environmental conditions. Across five deployments, 493 glider-days of data were collected, including 395 consecutive days during which at least one glider kept station at a monitoring site located 135 km southeast of Seward, Alaska. This poster summarizes operational outcomes and challenges, focusing on piloting strategies, battery endurance optimization, and logistical trade-offs inherent to long-duration autonomous missions. Lessons learned from this effort provide a practical framework for designing resilient, extended glider campaigns in other oceanographic settings. Findings highlight the importance of collaborative teamwork, pre-deployment best practices, adaptive control strategies, optimizing for endurance, piloting during storms, information management and seeking cost efficiencies.

A quiet approach: Seaglider deployment of the WISPR system

David Mellinger[1], *Jace Marquardt*[2], *Jay Turnbull*[1], *Erik Norris*[3], ***Jeremy Taylor***[3]

[1]Cooperative Institute for Marine Ecosystems and Resources Studies, Oregon State University and NOAA Pacific Marine Environmental Laboratory (PMEL); [2]College of Earth, Ocean, and Atmospheric Sciences, Oregon State University; [3]Uncrewed Marine Systems Program, Pacific Islands Fisheries Science Center (PIFSC), NOAA Fisheries

This project successfully integrated and commissioned Wideband Intelligent Signal Processor and Recorder (WISPR) payloads and high-fidelity hydrophones into several M1 and SGX Seaglider autonomous underwater vehicle (AUV) chassis to enhance passive acoustic monitoring (PAM) for marine research. The integration required custom CNC-machined electronics mounting plates to accommodate hardware within the glider's constrained volume, alongside the precision routing of internal wiring via SubConn underwater penetrators. Following rigorous environmental validation and operational ballasting, both units passed final functional diagnostics and immersion tank testing. By pairing WISPR sensors with low-noise, long-endurance Seaglider platforms, this work enables high-resolution autonomous acoustic data collection in remote regions, providing a robust and scalable alternative to traditional ship-based monitoring for marine mammal assessments and ocean noise studies.

Strengthening the monitoring of the Mexican Pacific during hurricane season using underwater gliders

*Enric Pallàs Sanz, **Miguel Tenreiro**: Centro de Inbestigación Científica y de Educación Superior de Ensenada (CICESE)*

The Eastern Tropical Pacific has traditionally been poorly sampled, resulting in significant uncertainty in the forecasts of the National Oceanic and Atmospheric Administration (NOAA)'sTropical Cyclone (TC) dynamics. This was evident, for example, in the inaccurate prediction of the rapid intensification of Hurricane Otis in 2022. Since June 2024 to present, the Group for Monitoring the Ocean withGliders (GMOG) has increased the real-time monitoring of the ocean state in the Tropical Pacific. This effort is intended to support the administration's capabilities in the TC intensification prediction through data assimilation into NOAA's operational models that has been possible through a bilateral collaboration between Mexico and the USA. In this poster we present some computations of the OHC along the glider trajectories and comparisons with satellite-derived OHC to address the role of sub-mesoscale in driving local ocean heat fluxes in the upper layer. A vertically integrated heat budget of the upper ocean is computed along the glider trajectory. Vertical velocity is diagnosed using a two-dimensional omega equation and turbulent diffusivity is parameterized using Osborn's (1980) parametrization and the dissipation rate of the turbulent kinetic energy (ε) is parameterized using the Law-of-the-Wall scaling based on ERA5 wind stress (D'Asaro, 2014) interpolated along the glider trajectory. Mixed-layer sub-mesoscale instabilities and Ekman buoyancy fluxes are also parameterized (Fox-Kemper et al 2008; Thomas 2005). The surface heat flux, including shortwave, longwave, latent, and sensible components was derived from hourly ERA5 reanalysis. The forcing terms for the budget equation (right hand side) is analyzed to quantify the role of mesoscale and sub-mesoscale flow structures into the vertical heat fluxes showing complex interactions between forcing terms and depending on the scale and type of structure.

Low salinity, high ocean heat content, and warm core eddy effects on the upper ocean response during Hurricane Sally (2020): An analysis of a hurricane glider observations and coupled atmosphere-ocean model

***Senam Tsei**, University of Southern Mississippi*

On 15 September 2020, Hurricane Sally traveled within ~32 km from the location of Seaglider SG601 of the National Oceanographic and Atmospheric Administration/National Weather Service/National Data Buoy Center (NOAA/NWS/NDBC) in the northern Gulf of Mexico (GoM). Data from SG601 were used to examine the changes in the upper 100 m of the ocean under Hurricane Sally winds. In this study, we show a 0.5–1°C cooling of the surface layer, recorded on the day of closest approach (DCA) of the glider to Hurricane Sally. We also found that freshwater from river discharge created an upper ocean barrier layer, which reduced the cooling of surface (or mixed) layer temperature by 38.6%. The high barrier layer potential energy (BLPE) together with the high buoyancy frequency squared (N2), prior to 15 September, indicated a very stable water column. Further analysis shows the interaction between SG601, Hurricane Sally, and a warm core Loop Current (LC) eddy in the northern GoM. Findings presented in this study also show that ocean models do not effectively simulate river discharge (plume) in the northern GoM.

In-situ calibration procedure of a Kongsberg WBT-mini in a Slocum glider wet-bay

Rebecca Walsh[1], *Yuleny Gomez Rodriguez*[1], *Amy Duh*[1], *Hank Statscewich*[2], *George R. Cutter*[1], *Rachel Lazzaro*[1], *Quinn Eisenmann*[3], *Chad Lembke*[4], *Alex Silverman*[4], *Edmund Hughes*[4], *Matthew J. Oliver*[1]

[1]University of Delaware, College of Earth, Ocean, and Environment - Lewes, DE; [2]University of Alaska, Fairbanks, College of Fisheries and Ocean Science - Fairbanks, AK; [3]Cape Henlopen High School - Lewes, DE; [4]University of South Florida, College of Marine Science - St. Petersburg, FL

Slocum gliders equipped with a Kongsberg WBT-mini echosounder are difficult to calibrate in-situ and therefore are often calibrated in deep pools. However, it is preferable to calibrate in the water type in which it will be deployed due to the influence of temperature and salinity on sound waves. Here we compare two calibration protocols: the idealized calibration performed in a deep pool and a field calibration performed in-situ. This field calibration protocol allows for flexibility in deployment location while maintaining data quality. By sharing these calibration methods for Slocum glider integrated WBT-mini echosounders, we hope other glider users interested in collecting active acoustic measurements from gliders will be better prepared to calibrate their own systems as part of their deployment activities.

The integrated physical-biochemical modeling system for the Chesapeake Bay: Coupling atmospheric, coastal oceanic, and groundwater dynamics

Meng Xia, *Long Jiang, Haoran Liu, Seyedeh Fardis Pourreza Ahmadi, Sreelakshmi Sreenivasan, Yiyang Xu, Adnan Khairullah, Bishnupriya Sahoo: Department of Natural Sciences, University of Maryland Eastern Shore, Princess Anne, MD*

Chesapeake Bay stands as one of the largest and most productive estuaries on the North American continent. In our research, we employed a 3-D hydrodynamic-biogeochemical-Lagrangian particle-tracking model, utilizing the offline linked Finite Volume Coastal Ocean Model (FVCOM), the Integrated Compartment Model (CE-QUAL-ICM) and particle trajectory model. The model demonstrated satisfactory skill in simulating total suspended solids (TSS), nutrients, dissolved oxygen (DO), and chlorophyll-a, including various phytoplankton groups over a decade-long period from 2003 to 2012. Our integrated modeling framework proved to be a robust tool for analyzing the spatiotemporal variations of key water quality parameters and identifying their primary physical drivers. This comprehensive approach allowed us to evaluate microbial dynamics, sediment transport, and the impacts of released dredged sediments. Furthermore, we investigated the bio-physical plume dynamics in Chesapeake Bay and examined the potential climatic impacts on phytoplankton variability and biochemical plumes within the estuarine ecosystem.

Recent research has applied an integrated groundwater and hydrological modeling system to the Chesapeake Bay region. This approach identified the vulnerabilities of both Chesapeake Bay and surrounding areas to storm surges and coastal flooding, which are influenced by variables such as precipitation, river discharge, and groundwater flux. In addition, the atmospheric model called Regional Climate–Weather Research and Forecasting Model, alongside the Congestion Mitigation and Air Quality (CMAQ) framework, was utilized to drive this modeling system, thereby providing crucial air quality inputs and realistic atmospheric force essential for the study of the Chesapeake Bay ecosystem.

In the future, this Chesapeake Bay modeling system will be improved by including the adjacent coastal ocean glider dataset and other observational datasets.

Other Events

Mentorship Match-Up

DAY 1 | May 18 **10:15 - 11:00**

The Mentor Match-Up initiative is designed to connect early-career professionals and student participants with experienced glider scientists, engineers, program managers, and operators for meaningful yet informal conversations during the workshop. Through these connections, participants can gain valuable advice, ask questions, learn from real-world experiences, and expand their professional networks within the glider community. The initiative focuses on creating supportive and productive relationships that encourage growth, collaboration, and knowledge sharing.

If you are participating in the Mentor Match-Up, an initial opportunity to meet with your mentor will take place during the first break on Day 1. After that, you are encouraged to connect with your mentor as you see fit throughout the remainder of the workshop.

Early Career Mentorship Lunch

DAY 2 | May 19 **13:00 - 14:00**

Join us for an interactive early-career lunch featuring a panel of professionals working with ocean gliders across academia, government, and industry. Panelists will share the real stories behind their career paths, including key decisions, opportunities in the field, and lessons learned along the way, along with practical advice for navigating your own career. Whether you're interested in science, engineering, or data analysis, this session offers a chance to explore the range of careers connected to gliders and ocean observing. Come with your questions and join the conversation!

Panel: Erica Fruh, NOAA; Ben Allsup, NOC; Chad Lembke, USF; Brian Buckingham, Rutgers University; Shea Quinn, Teledyne; Mat Dever, RBR.

Plenary Sessions

DAY 3 | **May 20** **08:45 - 10:00**

International Partnerships and Logistics

Chairs: Jorge Brenner, GCOOS; Doug Wilson, University of the Virgin Islands

This plenary session will explore the importance of transboundary collaboration and the value of working across geographic, organizational, and international boundaries to address shared priorities, meet goals, and overcome complex challenges. A geographically diverse panel will discuss common barriers to international partnerships and projects, including shipping challenges and logistics, permitting requirements, regulatory differences, communication barriers, and resource limitations, as well as share lessons learned from their experiences, and highlight practical strategies and needs. The session will also provide an opportunity for the UG2 community to speak, share their own experiences, and contribute perspectives on needs, opportunities, and solutions for strengthening partnerships across international waters.

Objectives:

- Highlight and promote the importance and benefits of transboundary and international collaboration in addressing shared goals
- Identify common barriers and complexities associated with working across geographic, organizational, and international boundaries
- Identify challenges and share lessons learned, best practices, and real-world experiences
- Explore practical solutions, tools, and resources that can improve coordination, communication, and long-term collaboration (i.e., potential action items)

DAY 3 | **May 20** **10:45 - 11:45**

Looking Forward: AI and Gliders Discussion

Chairs: Jen Bowers, NOAA NESDIS NCEI; Bob Currier, Texas A&M University - Oceanography / OCEANCODA LLC

This session explores how AI is rapidly becoming embedded in glider operations, shifting from experimental use to fully operational systems, featuring a plenary presentation by Bob Currier. Through examples like OLORIN, Lethe, and GUARDIAN, it highlights how AI enhances real-time monitoring, data processing, and species detection while improving transparency and accessibility. The session will also include dedicated time for community discussion on AI applications, needs, and concerns, emphasizing that the future of glider science will be driven more by the data infrastructure connecting observations, models, and decision-makers.

Going AI-Native: Production AI in Glider Operations

Bob Currier, Texas A&M University - Oceanography / OCEANCODA LLC

AI-native is no longer aspirational for glider programs — it's operational, and the programs that haven't started are already behind. OLORIN tracks 4,300+ Argo floats and AUVs in real time through a conversational interface, with new AI modules reading vehicle battery profiles and analyzing operational logs alongside the human pilot. Lethe denoises raw glider hydrophone audio through an open-source MCP server, making the unglamorous preprocessing layer of AI pipelines accessible to anyone running a hydrophone-equipped glider. GUARDIAN classifies endangered Rice's whale vocalizations at 97% accuracy, with Grad-CAM heatmaps that make every detection visually verifiable. Together, these three systems open the Data Infrastructure and Interoperability session with a clear thesis: the next decade of glider science will be defined less by new sensors than by the data infrastructure that mediates between observations, models, and the people — and agents — making decisions from them.

Industry-Focused Sessions

DAY 3 | May 20 **13:00 - 14:00**

Industry Community Session: Community needs and next steps

Facilitator: Bill Lingsch, NOAA Contractor

Join our UG2 industry partners for a Q&A session focused on understanding the community's current and future needs. This is a great opportunity to ask your burning questions and share your glider wish list directly with industry leaders. Participating industry members include:

Teledyne Marine
Shea Quinn – *Slocum Glider Product Line Manager*, Cordie Goodrich – *Slocum Glider Technical Support and Field Operations Manager*

RBR
Mat Dever – *Research Scientist*

Rockland Scientific
Candace Smith – *Sales Manager, North America;* Nicolai von Oppeln-Bronikowski – *Field & Support Team Manager*

D-2 Incorporated
Dean Fougere – *Vice President*

WASSOC
Matthew Green – *Engineer*

Ongoing

Networking B-I-N-G-O for all UG2 workshop attendees!

The UG2 Workshop is three action-packed days bringing together every kind of glider operator and users of all experience levels. To help everyone connect, we've created a Networking G-L-I-D-E-R Game for the workshop (think BINGO—with a glider twist!).

Your mission: meet new people, spark conversations, and fill your card by finding participants who match each square. The first two people to complete their card will win a small prize!

We hope this game makes networking easy, fun, and a little adventurous-encouraging you to connect with people you may not have met otherwise. By the end of the workshop, you might leave not only with new ideas, but with a full list of contacts to keep the glider conversations going long after the event ends.

Pick up your bingo sheets at the registration table!

Logistics

St. Petersburg, Florida is a vibrant coastal city known for its beaches, lively arts scene, and waterfront parks. It offers a relaxed vibe and a bustling downtown filled with several museums, galleries, shops and restaurants. Please see *VisitFlorida* and *VisitStPeteClearwater* for more information.

When:

May 18-20, 2026

Where:

Grand Ballroom
University Student Center (USC)
USF St. Petersburg
200 6th Avenue South
St. Petersburg, FL 33701
(727) 873-5179

Hotel Block:

Hilton St. Petersburg Bayfront
333 1st St SE
St. Petersburg, FL 33701

Telephone: (727) 873-4873
Email: *SPTSH_DS@hilton.com*

Getting from the Airport to St. Petersburg:

Tampa International Airport (TPA) is located approximately 23 miles from St. Petersburg, which is generally a 30- to 40-minute drive, depending on traffic. The two cities are connected by several bridges, including the scenic Sunshine Skyway Bridge.

Transport options from TPA to St. Petersburg:

Uber: Rideshare apps are available and will cost on average $40 one-way from TPA to downtown St. Petersburg.

Shuttle: *TPA Shuttles* offer regular, reasonably priced transportation between TPA and downtown St. Petersburg.

Workshop Hotel Block:

Hilton St. Petersburg Bayfront
333 1st St SE, St. Petersburg, Florida, 33701
727-894-5000

Hilton St. Petersburg Bayfront is centrally located in St. Petersburg, steps from Al Lang Stadium and within a 5-minute walk of University of South Florida-St. Petersburg. There are plenty of nearby restaurants and the hotel offers room service. One buffet breakfast is included in the hotel block.

Local restaurants
Rococo Steak
Ceviche Tapas Bar & Restaurant
Baba on Central
Ford's Garage
Red Mesa Cantina

University Student Center Venue Parking:

There are several options for venue parking.

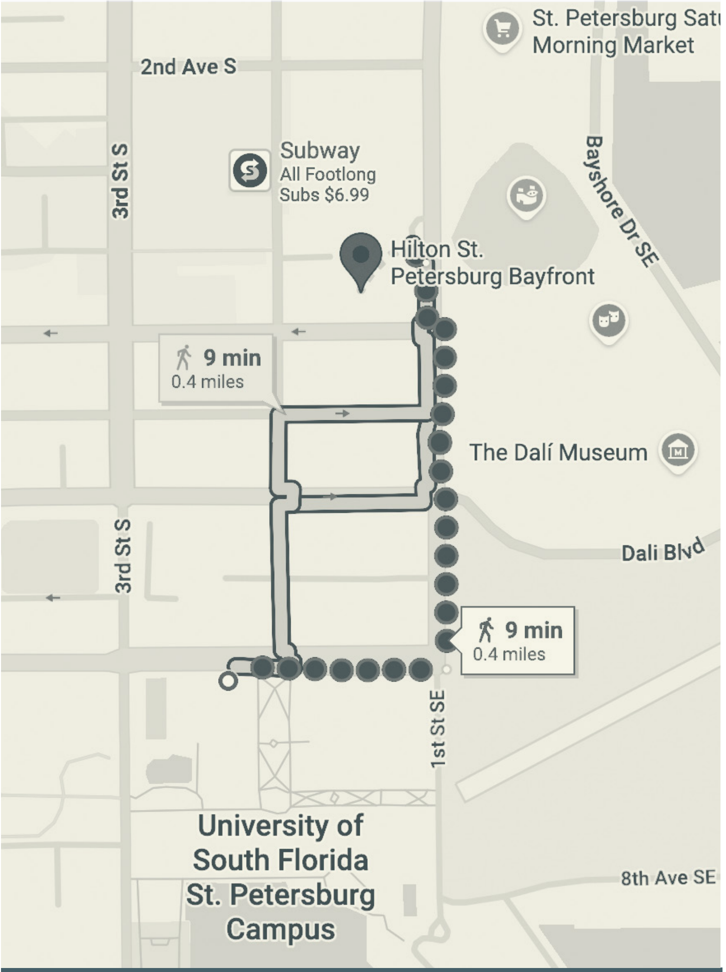
Option one: all attendees can self park in the parking garage on levels 2-4 using the Park Mobile app. There is a fee of $5 for the whole day.

Option two: Attendees can find street parking throughout the city, using the Park Mobile app.

Learn more.

Workshop Meals and Beverages:

Please bring a reusable water bottle. Morning and afternoon coffee breaks, as well as lunch, will be provided each day of the workshop.



Contacts:

We welcome all questions and comments before, during, and after the workshop. Please email Georgia Coward (UG2 Coordinator) *gcoward@ucar.edu* or *info@underwatergliders.org*.

Appendix A: Committees

Primary Organizing Committee

The organizing committee would like to thank the community for coming together to highlight the successes of the national and international Glider Community and for taking the time to tackle the difficult challenges we face. The organizing committee includes:

Jennifer Bowers – *UxS Data Enterprise Project Manager, NOAA*

Jorge Brenner – *Executive Director, Gulf Coast Ocean Observing System*

Patricia Chardón-Maldonado – *Technical Director, Caribbean Coastal Ocean Observing System*

Georgia Coward – *UG2 Coordinator, Center for Ocean Leadership (UCAR)*

Karen Dreger – *Research Professional, Skidaway Institute of Oceanography at the University of Georgia*

Erica Fruh – *Program Specialist, NOAA Uncrewed Systems Operation Center*

Cordie Goodrich – *Teledyne Webb Research*

Joe Gradone – *Assistant Professor, Rutgers University*

Sherryl Gilbert – *USF, College of Marine Science*

Greg Johnson – *RBR*

Barbara Kirkpatrick – *Senior Advisor, Gulf Coast Ocean Observing System*

Chad Lembke – *USF, College of Marine Science*

Bill Lingsch – *Glider Contractor, National Oceanic and Atmospheric Administration*

Kevin Martin – *University of Southern Mississippi*

Russ Miller – *Observing System Engineer and the Observing Systems Theme Lead for the Cooperative Institute for Great Lakes Research (CIGLR) University of Michigan*

Jennifer Sevadjian – *Data Systems Analyst, Scripps Institution of Oceanography*

Cassie Wilson – *Program Specialist, Center for Ocean Leadership (UCAR)*

Doug Wilson – *Director, UVI Ocean Glider Laboratory*

UG2 Steering Committee 2023-2026

Georgia Coward – ***UG2 Coordinator***, *Center for Ocean Leadership (UCAR)*

Kathleen Bailey – *Glider Program Manager, U.S. IOOS, National Oceanic and Atmospheric Administration*

Jennifer Bowers – *UxS Data Enterprise Project Manager, NOAA*

Jorge Brenner – *Executive Director, Gulf Coast Ocean Observing System*

Patricia Chardón-Maldonado – *Technical Director, Caribbean Coastal Ocean Observing System*

Karen Dreger – *Research Professional, Skidaway Institute of Oceanography at the University of Georgia*

Erica Fruh – *Program Specialist, NOAA Uncrewed Systems Operation Center*

Cordie Goodrich – *Teledyne Webb Research*

Carl Gouldman – *Executive Liaison, U.S. IOOS, NOAA*

Joe Gradone – *Assistant Professor, Rutgers University*

Greg Johnson – *RBR*

Barbara Kirkpatrick – *Senior Advisor, Gulf Coast Ocean Observing System*

Bill Lingsch – *Glider Contractor, National Oceanic and Atmospheric Administration*

Kevin Martin – *Senior Marine Instrumentation Specialist – Ocean Observing Manager, University of Southern Mississippi*

Russ Miller – *Observing System Engineer and the Observing Systems Theme Lead for the Cooperative Institute for Great Lakes Research (CIGLR) University of Michigan*

Jennifer Sevadjian – *Data Systems Analyst, Scripps Institution of Oceanography*

Hank Statscewich – *Physical Oceanographer, University of Alaska Fairbanks College of Fisheries and Ocean Sciences*

Victor Turpin – *OceanGliders, AniBOS, and Argo Technical Coordinator, OceanOPS, World Meteorological Organization*

Doug Wilson – *Director, UVI Ocean Glider Laboratory*

Yui Takeshita – *Monterey Bay Aquarium Research Institute*

Appendix B: Sponsors

The UG2 Workshop '26 St. Petersburg participants extend a special thanks to our sponsors:

IOOS Integrated Ocean Observing System

University of South Florida College of Marine Science

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Teledyne Marine Everywhereyoulook™

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COMMUNITY CONTRIBUTORS

Nortek

ASL Environmental Sciences

COMMUNITY SUPPORTER

Woods Hole Group A CLS Company

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Joshua Soll
Sponsored by

TELEDYNE MARINE
Everywhereyoulook™

Joshua Soll, MSc is a marine technology and uncrewed systems professional with hands-on experience in end-to-end AUV operations, data processing and analysis, passive acoustics, and scientific communications. His interests lie at the intersection of ocean observing systems, environmental conservation, and public engagement.

Keiley Gregory
Sponsored by

OCEAN TRACKING NETWORK

Keiley Gregory is a master's student and research assistant in the Ocean Glider Laboratory at the University of the Virgin Islands conducting research on the habitat use and preferred oceanographic and geomorphic conditions of cetaceans in the Caribbean, particularly in waters surrounding Puerto Rico and the Virgin Islands. This project aims to contribute to ecosystem-based management and conservation by enhancing cetacean monitoring capabilities and informing management decisions for numerous protected species in the Caribbean region.

William Menapace
Sponsored by

RBR

William Menapace is an undergraduate studying Oceanography and Marine Biology and is the Co-Chief Scientist of the Student Seaglider Center at the University of Washington. He is interested in understanding the biophysical dynamics within marine ecosystems using modern ocean technology to better predict future ecological effects of climate change.

Appendix C: Registrants

Kyle Aaron – *JASCO Applied Sciences*

Ehsan Abdi – *Akvaplan-niva*

Ben Allsup – *National Oceanography Centre*

Leila Baghdad Brahim – *Tetratech, Ocean Science*

Kathleen Bailey – *NOAA/U.S. IOOS Office*

Carlos Barrera – *PLOCAN*

Xinara Bascombe – *The Caribbean Institute for Meteorology and Hydrology*

Sean Beckwith – *University of South Florida College of Marine Science*

Jennifer Bowers – *NOAA NESDIS NCEI*

Olivia Braswell – *University of Southern Mississippi*

Jorge Brenner – *GCOOS*

Heather Broadbent – *University of South Florida*

Brian Buckingham – *Rutgers University Center for Ocean Observing Leadership (RUCOOL)*

Kourtney Burger – *University of California, Santa Cruz & NOAA SWFSC*

Naomi Ciampaglio – *CSA Ocean Sciences Inc.*

Mariarita Caracciolo – *ENSTA - OceanOPS*

Jonny Chapman – *Bermuda Institute of Ocean Sciences - ASU*

Adam Comeau – *Ocean Tracking Network*

Brady Conlon – *Mote Marine Laboratory & Aquarium*

Anthony Cossio – *NOAA/ Southwest Fisheries Science Center*

Bailey Counts-Morgan – *Sea-Bird Scientific*

Georgia Coward – *UCAR Center for Ocean Leadership*

Robert Currier – *GCOOS*

Mathieu Dever – *RBR / WHOI*

Karen Dreger – *Skidaway Institute of Oceanography*

Amy Duh – *University of Delaware*

Brian Dzwonkowski – *University of South Alabama*

Cassandra Elmer – *Earth Sciences New Zealand*

David English – *University of South Florida*

Caleb Flaim – *Williamson & Associates Technologies*

Dean Fougere – *D-2 Incorporated*

Michael Fraser – *Teledyne Marine*

Selene Fregosi – *Marine Mammal Institute, Oregon State University/PIFSC*

Héloïse Frouin-Mouy – *University of Miami (CIMAS) / NOAA SEFSC*

Erica Fruh – *NOAA Uncrewed Systems Division*

Yao Fu – *University of South Florida*

Andrew Gadbois – *Teledyne Marine*

Salvador Garcia – *Woods Hole Group, Inc.*

Lori Garzio – *Rutgers University*

Scott Glenn – *Rutgers University*

Cordie Goodrich – *Teledyne Webb Research*

Donglai Gong – *Virginia Institute of Marine Science - William & Mary*

Matthew Green – *Williamson & Associates Technologies*

Keiley Gregory – *University of the Virgin Islands*

Michael Hall – *Advanced Oceanics*

Travis Hamlin – *University of the Virgin Islands*

Chaz Hartmann – *Investor*

Joshua Hill – *Institute for Advanced Analytics and Security (USM)*

John Horne – *University of Washington*

Liesl Hotaling – *Marine Technology Society*

Hana Hourston – *Dalhousie University*

Ed Hughes – *CSA Ocean Sciences*

Appendix C: Registrants

George Jacobs – *US Navy*

Pappu Jha – *University of Southern Mississippi*

Shaun Johnston – *SIO, UCSD*

Brad Joseph – *Teledyne Marine*

Bibas Kandel – *Institute for Advanced Analytics and Society, The University of Southern Mississippi*

Ellis Keener-LaCroix – *Ocean Tracking Network*

Barbara Kirkpatrick – *Texas A & M*

Jochen Klinke – *Sea-Bird Scientific*

Ana Krelling – *UMD/NOAA/NCEI*

Gerhard Kuska – *MARACOOS*

Rachel Lazzaro – *University of Delaware*

Matthieu Le Henaff – *NOAA/AOML*

Matthew Learn – *NOAA/AOML*

Jean-Michel Leconte – *RBR*

Chad Lembke – *University of South Florida*

Bill Lingsch – *IOOS*

Natalia Lopez Figueroa – *GCOOS*

Sarina Mann – *NOAA IOOS*

Michael Marsik – *COL*

Kevin Martin – *University of Southern Mississippi - Marine Science*

Aaron Mau – *Voice of the Ocean Foundation*

William Menapace – *University of Washington*

Enrico Milanese – *Woods Hole Oceanographic Institution*

Travis Miles – *Rutgers University*

Russ Miller – *University of Michigan CIGLR*

Ben Minichino – *Aerospace & Defense, Qt Group*

Jhon Mojica – *University of Miami*

Jamaris Moore – *US Navy*

Joanne Muller – *Florida Gulf Coast University*

Korie Novak – *University of South Florida*

Erin Oleson –*NOAA Pacific Islands Fisheries Science Center*

Sage Otulo – *University of Washington*

Enric Pallàs-Sanz – *Centro de Inbestigación Científica y de Educación Superior de Ensenada (CICESE)*

Jenn Patterson Sevadjian – *Scripps Institution of Oceanography*

Lydia Paulic – *University of Windsor-RAEON*

Mike Parsons – *Florida Gulf Coast University*

Nick Pawlenko – *Uncrewed Systems Operations Center / NOAA*

Steve Pearce – *ASL Environmental Sciences*

Nicholas Peckich – *Naval Oceanographic Office*

James Pegg – *DFO/C-PROOF*

Dawn Petraitis – *NOAA/NWS/ National Data Buoy Center*

Brandon Pinelli – *Teledyne Marine*

Abhiyan Poudel – *Institute for Advanced Analytics and Society, The University of Southern Mississippi*

Evan Price – *Nortek*

Xiao Qi – *GCOOS*

Shea Quinn – *Teledyne Webb Research*

Shannon Rankin – *NOAA Fisheries*

Dev Rao – *University of South Alabama and Dauphin Island Sea Lab*

Grant Rawson – *NOAA/OMAO/UxSOC*

Christian Reiss – *Marea Oceanographic Services*

Calvin Rose – *Student*

Daniel Rudnick – *Scripps Institution of Oceanography*

Saraswathy Sabu – *Indian National Centre for Ocean Information Services (INCOIS)*

Christian Saiz – *University of Miami & NOAA/AOML*

Appendix C: Registrants

Kristen Sauby – *NOAA/NESDIS/NCEI*

Victoria Scriven – *ESA*

Shannon Searing – *Teledyne Marine*

Robert Shapiro

Cole Sheeley – *University of the Virgin Islands*

Andrew Shropshire – *Teledyne Marine*

Alex Silverman – *University of South Florida*

Chris Simoniello – *Texas A&M University/GCOOS*

Candace Smith – *Rockland Scientific*

Matt Smith – *Texas A&M Geochemical & Environmental Research Group*

Brad Smith – *SURF Robotics*

Joshua Soll – *University of the Virgin Islands; Skidaway Institute of Oceanography, University of Georgia*

Patrick Spezzano – *Rutgers University*

Jimmy Spore – *Woods Hole Group (CLS)*

Hank Statscewich – *University of Alaska Fairbanks*

AJ Stewart – *Dauphin Island Sea Lab*

Jeremy Taylor – *NOAA/PIFSC*

Miguel Tenreiro – *CICESE*

Robert Todd – *Woods Hole Oceanographic Institution*

Senam Tsei – *University of Southern Mississippi*

Jay Turnbull – *Oregon State University / CIMERS*

Jude van der Meer – *Ocean Tracking Network - Dalhousie University*

Eduardo Vaz – *Rockland Scientific*

Ravi Chandra Vedula – *INCOIS*

Nicolai von Oppeln-Bronikowski – *Rockland Scientific*

Robyn Walker – *Fisheries and Oceans Canada*

Jen Walsh – *NOAA Southwest Fisheries Science Center*

Becca Walsh – *University of Delaware*

Benjamin Werb – *Monterey Bay Aquarium Research Institute*

Doug Wilson – *University of the Virgin Islands*

Cassie Wilson – *UCAR Center for Ocean Leadership*

Wendy Wilz – *NAVOCEANO*

Megan Wood – *Saltwater, Inc.*

Dr. Meng Xia – *University of Maryland Eastern Shore*

Safak Yamali – *Institute for Advanced Analytics and Society, The University of Southern Mississippi*

Mark Yamane – *University of Washington*

Bo Yang – *University of South Florida*

Appendix D: Workshop Job Board

Positions

Job title	Organization	Location	Application due / closing	Pay	Term / type
Able Seafarer, R/V *David Packard*	MBARI	Moss Landing, CA	Open / not specified	Not listed	Full-time
Visiting Instructor / Assistant Teaching Professor, Hydrographic Science	University of Southern Mississippi	Gulfport / Ocean Springs, MS	Jun. 1, 2026	$70,000 – $78,100	12-month term
Senior Opto-Mechanical Engineer	Sea-Bird Scientific / Veralto	Bellevue, WA	Open, posted Apr. 29, 2026	$130,000 – $151,000	Full-time
Field Service Technician	Sea-Bird Scientific / Veralto	Brisbane, Australia	Not specified	Not specified	Full-time
Sea-Bird Scientific Production Assembly Technician I	Sea-Bird Scientific / Veralto	Bellevue, WA	Not specified	Not specified	Full-time
Senior Electrical Engineer	Saildrone	Alameda, CA	Open, posted Apr. 23, 2026	$135,000 – $159,000 + equity	Full-time
Senior Embedded Software Engineer	Liquid Robotics	Potomac region / hybrid	Open, posted Apr. 17, 2026	$142,000 – $253,000	Full-time
Director, Center for Marine and Environmental Studies	University of the Virgin Islands	St. Thomas, USVI	Not specified	Commensurate with experience	Full-time
Uncrewed Systems Service Technician, Slocum Gliders	Teledyne Marine	North Falmouth, MA	Open / not specified	$51,600 - $68,800 - $86,000	Full-time
Electronic Design Technician	Teledyne Marine	North Falmouth, MA	Open / not specified	$113,600 - $151,400	Full-time
Technical Sales Account Manager	RBR Global	Quimper, France	Open / not specified	Not specified	Full-time
Embedded System Designer	Rockland Scientific International	Victoria, BC, Canada	Open / not specified	$80,000 – $100,000 CAD	Full-time, permanent
Quality Control & Testing Specialist	Rockland Scientific International	Victoria, BC, Canada	Open / not specified	$65,000 – $85,000 CAD	Full-time, permanent

Appendix D: Workshop Job Board

Job title	Organization	Location	Application due / closing	Pay	Term / type
Senior Technical Analyst	NOAA contractor, ISS	Remote	Not specified	Not listed	Not specified
Postdoctoral Fellowship, Ocean Observation, Analysis, and Predictions	C-PROOF / University of Victoria	British Columbia, Canada	Under review from Apr. 2025	Not listed	Postdoc fellowship
Data Coordinator	University of Gothenburg	Gothenberg, Sweeden	June 20, 2026	Not listed	Full-time, permanent
Research Associate III (MC&G)	Woods Hole Oceanographic Institute	Massachusetts	Open, posted May 5, 2026	$79,565 - $103,133	temporary, full-time, 6 month fixed term

Opportunities

Opportunity	Organization / program	Due date(s)	Funding amount	Notes
Harmful Algal Bloom Toxin Detection for Seafood Safety	NOAA / NOS / NCCOS Competitive Research Program	Full proposals due July 16, 2026	Not listed	Relevant for glider-based HAB sensing, toxin detection, and seafood safety monitoring
Technologies to Control Harmful Algal Blooms	NOAA / NOS / NCCOS Competitive Research Program	Full proposals due July 9, 2026	Not listed	Relevant if gliders support HAB detection, monitoring, or intervention testing
Early Career Investigator Program in Earth Science	NASA ROSES	Mandatory Notice of Intent due May 18, 2026; full proposals due Jun. 17, 2026	Not listed	Relevant for early-career researchers using gliders for Earth science, ocean, air-sea, or climate questions
StartBlue Fall 2026 Program	StartBlue	Applications due Jun. 21, 2026	Up to $20,000 for early-stage startups; up to $150,000 for mid-stage startups	Virtual info sessions May 27 and Jun. 12
Future Investigators in NASA Earth and Space Science and Technology, FINESST F.5, ROSES-25	NASA	Proposals due Jul. 14, 2026	Not listed	Graduate student-designed and performed research projects; webinar May 28; optional Teams office hours Jun. 23 and Jun. 24

Appendix D: Workshop Job Board

Opportunity	Organization / program	Due date(s)	Funding amount	Notes
U.S. IOOS Ocean Technology Transition Project (OTT)	NOAA IOOS	Full proposals due Jul. 15, 2026	Not listed	Funds new or existing technology-based solutions for coastal observing, product development, and data management challenges. Strong direct fit for glider technology, sensors, observing products, and glider data systems
2026 Neptune Awards	Ocean Exchange	Applications due Aug. 7, 2026	Three $100,000 awards	Relevant for scalable ocean solutions, including glider-enabled observing or sustainability applications
U.S. Scholar Award in Ocean, Climate, and Space	AIR Centre + Fulbright Commission	Applications due Sep. 15, 2026	Not listed	Relevant for U.S. scholars proposing ocean, climate, space, Earth observation, or international collaboration projects. Potential fit for glider-based ocean observing research

Underwater Glider User Group

A community-based coalition aimed at bolstering scientific collaboration, information, and resource sharing for gliders

underwatergliders.org

Underwater Glider User Group (UG2)

youtube.com/@UG2media

info@underwatergliders.org