



Organization of Biological Field Stations

Supporting environmental research, education, and public understanding

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“Above all, don't fear difficult moments. The best comes from them.” - Rita Levi-Montalcini (neurobiologist, Nobel Prize winner)

President's Message

By Chris Lorentz

On behalf of the OBFS Board and the Planning Committee, we would like to offer a note of appreciation to all the presenters and participants at the 2020 Annual Meeting, *“Adaptation and Resiliency in a Changing World.”* It was our first-ever virtual conference, with over 225 participants, and thanks to all of you and by all accounts, it was a big success.

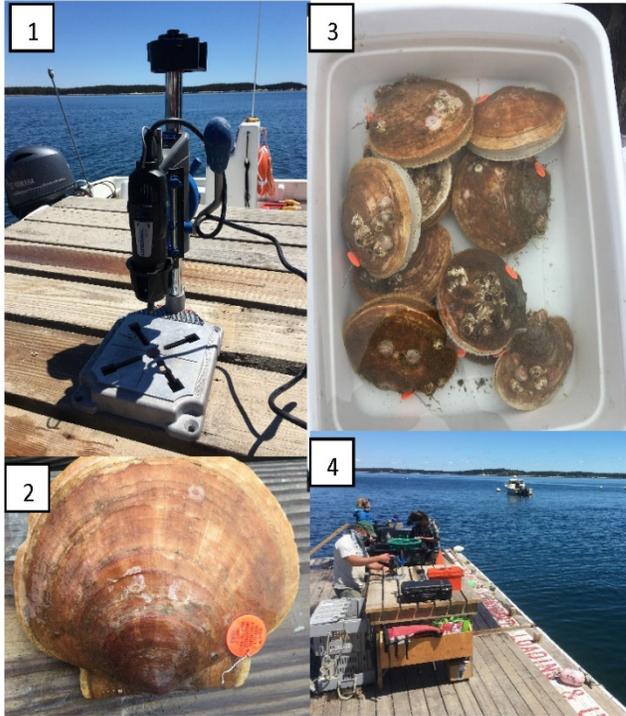
From the initial workshops, through the plenaries, lightning talks and concurrent sessions, the week was filled with a diverse array of speakers who shared their expertise and experiences, along with keen insights and welcome inspiration, for which we are all grateful. And with the new member welcome reception, social hours and the last night's auction, the camaraderie, collegiality, and collaborative nature of the OBFS community were displayed throughout.

We would like to offer our congratulations again, to Friday Harbor Labs, as this year's recipient of the OBFS Human Diversity Award and for their successes towards increasing the diversity, equity and inclusivity for undergraduates in the field sciences; helping us move the needle towards access for all.

Lastly, let's strive together to maintain the momentum of the meeting and carry the energy and enthusiasm of the week throughout the year, until we can meet again in Montana.

Station Profile: Hurricane Island

By Phoebe Jekielek, Research Director



Greetings from the Hurricane Island Center for Science and Leadership in Penobscot Bay, Maine. Our mission is to integrate science education, applied research, and leadership development through year-round educational programs and a seasonal, environmentally sustainable island community.

This year, of course, has been very different without programs running May-October on the Island. However, the research never stops. In Spring 2020, with Maine Sea Grant Program Development funds, we conducted a scallop tagging study with the Maine Department of Marine Resources. This tag-recapture study will provide spatially explicit growth information, help identify areas for closures and enhancement, and shine light on the scale of movement, potential for exchange of scallops between management areas, and potential size ranges at which scallops are less likely to disperse away from an enhanced area.

Working with local wild scallop harvesters and the lobster fishing industry, we identified areas for collection around Hurricane to have as little impact as possible on the benthos and surrounding lobster fishing activity. Once caught, we drilled a 0.8mm hole in the “ear” (hinge on the top side) of the scallop shell (Picture 1). We then threaded a 0.6 mm wire with a labeled tag through this hole (Pictures 2 and 3). Tags were printed with an ID number and contact phone number and the tag number, shell height, and shell width were recorded for each scallop. We tagged and redeployed 800 scallops and, when caught during the scallop season, the tag number, catch location, and shells will be returned to us by fishermen. To understand tag retention and mortality, we are also growing 200 tagged scallops in our aquaculture site. An essential part of this effort was working with local wild scallop harvesters and the local community, it would not have been possible without their support, knowledge, and assistance (Picture 4). Stay tuned!!

Transitions:
Jeff Brown and Faerthern Felix retired from University of California - Berkeley's Sagehen Reserve. Part of their legacy includes the #ArtSciConverge artist in residency program. The picture to the right shows them in front of one of the art installations at Sagehen. Read more about it at <https://issues.org/artsciconverge-at-sagehen-creek-field-station/>.





Painstakingly stitched together from screen shots of some of the 225 attendees of the 2020 virtual OBFS annual meeting, photo created by Philippe Cohen



Congratulations to Friday Harbor Labs - winner of the 2020 OBFS Human Diversity Award

Research Experiences for Undergraduates (REU) Program:

- Since 2010, funding from NSF and from a donor endowment, both emphasize support of URM students (marine science is historically Very White)
- 8-12 students each summer spend 8 weeks at FHL, working one-on-one with a mentor on a research project
- Students get a stipend, travel expenses, room and board at FHL



Key elements of REU program

- Recruitment efforts by program coordinator from Howard University, previous one from Georgia Southern Univ.
- Attractive funding: "better than a summer job"
- URM students having some mentors that "look like me"
- This year had Black mentors who started in the program as undergrads and now are faculty! *Such visibility of success is priceless.*
- Lots of team-building, planned social events



But we have a long way to go!

- Hard to recruit diverse students into our regular courses: what are the barriers?
- No local faculty or staff who are BIPOC
- Have funds to hire a postdoc this year, will strongly encourage URM candidates





As a community, we acknowledge that many groups are not well-represented in field sciences. Our community wishes to enable access and participation of all these groups, and the research is encouraging. Young scientists from underrepresented groups who have good experiences in the field are more likely to pursue a STEM career. The converse is also true: a substantial number of young scientists experience harassment, bullying, and/or assault by their colleagues in the field. Those who have bad experiences are much more likely to withdraw from fieldwork or scientific pursuits entirely.

The AdvanceGEO Partnership has developed a rich set of workshops and tools that field practitioners can use to prevent and respond to harassment in the field. ADVANCEGeo offers workshops where trainers come to your facility or department, and now there are virtual options as well. They have modules on bullying, implicit bias, microaggressions, fieldwork environments, and developing codes of conduct that can be adapted for different audiences. At our 2020 OBFS Annual Meeting, over thirty OBFS members attended a workshop on responding to harassment in the field.

AdvanceGEO's website is publicly available, and has resources on fieldwork, creating inclusive climates, legal issues, anti-racism, example codes of conduct, and a library of research. Find all of these toolkits and contact information at: <https://serc.carleton.edu/advancegeo/>

Affiliates Notes by Paul Foster, OBFS Board Representative to AIBS

AIBS The report from last year's American Institute of Biological Sciences Council meeting is available. The title of the meeting was "Beyond Specimens: Research, Education, and Policy" and addressed how best to enhance, promote, and mobilize biodiversity data.ⁱ Topics included demonstrating the impact of collections and specimens-based research, implementing the extended specimen concept, standardizing across databases and collaborations, the Nagoya Protocol, and museum collections in the classroom.

The theme of the December 2020 Council meeting is "Strengthening the Bioeconomy."ⁱⁱ Bioeconomy is defined as "economic activity driven by research and innovation in the life sciences and biotechnology, and that is enabled by technological advances in engineering and in computing and information sciences. Please contact me if you have comments or suggestions on what you might want addressed or gathered from the meeting.

ESA The Public Affairs Office of the Ecological Society of America provides news and information on how the decisions of the US Federal Government may affect biological field stationsⁱⁱⁱ. Their bimonthly newsletter is especially thorough.

NSF The Directorate for Biological Sciences of the National Science Foundation issued a new guidance on Data Management Plans on September 10^{iv}. Rolling deadlines continue for planning grants and infrastructure proposals under the Field Stations and Marine Laboratories solicitation^v.

If you have comments or suggestions about future collaboration news you'd like to see, please email me at pfoster@bijagual.org.

ⁱ <https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biaa084/5908378>

ⁱⁱ https://www.aibs.org/events/2020_aibs_council_meeting.html

ⁱⁱⁱ <https://www.esa.org/public-policy/>

^{iv} <https://www.nsf.gov/bio/biodmp.jsp>

^v https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5449

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New Ocean Acidification Laboratory at the Downeast Institute

By Sara Randall, Associate Director

A new laboratory for studying the impacts of ocean acidification and warming on marine organisms has been completed at the [Downeast Institute](#) (DEI) in Beals, Maine.

The state-of-the-art laboratory was designed and fabricated by DEI's Postdoctoral Associate Dr. Robert Holmberg to conduct ocean acidification and warming experiments. "The ocean acidification (OA) lab is equipped to fulfill the diverse needs of scientists across the research spectrum and accommodates a wide variety of organisms and experimental designs," explained Dr. Holmberg. "Tanks can be configured for any pH and temperature setpoints, all of which can be changed through time to simulate fluctuations in seawater parameters. The lab's capabilities provide scientists with the tools to better understand and predict the impacts of global environmental change."

A full description of the OA lab can be found on DEI's website: <https://downeastinstitute.org/our-facility/for-scientists/ocean-acidification-labratory/>

The completion of the OA lab puts the finishing touch on a recent \$6 million facility expansion at DEI, the easternmost marine research laboratory and education center in the United States. Located on an island amid the distinctive Eastern Maine Coastal Current, DEI's campus also includes a 15,000 sq. ft. marine research hatchery for shellfish and other invertebrates, as well as labs with and without running seawater

"The research conducted in DEI's new OA lab will illuminate how ocean acidification combined with warming seawater temperatures impact marine systems. The knowledge gained here will increase the capacity of the fishing and aquaculture industries to adapt to ocean conditions as well as improve the ability to manage and protect marine systems, while contributing to the understanding of fundamental ecological principles," explained Holmberg. "It is very exciting to have this system available for DEI's use, as well as for others in the scientific community."

Contact Dr. Rob Holmberg to learn more: (207) 259-5086 or rholmberg@downeastinstitute.org.



Station Profile: Forfar Field Station - Andros, Bahamas

By Becky Schmitthenner, Program Coordinator

Forfar Field Station is owned and operated by [International Field Studies \(IFS\)](#), a nonprofit founded in 1970 dedicated to providing environmental education, scientific research, and cultural awareness through experiential learning.

Forfar Field Station is a rustic former dive resort located on the east coast of Andros, the largest of the Bahamian Islands. Since opening, Forfar has served as an educational and field studies resource to over 50,000 students and group leaders that range from elementary/middle/high school level to college and graduate students to researchers. Forfar has educational staff who live on the island year-round facilitating guided field excursions and academic lectures. Most field study trips are a week in length and involve educational groups ranging in size from 10-45 participants with a focus on Marine Science, Geology, Botany, Climate Change, or other fields of science as well as social science topics.

The typical week-long field study experience includes a mix of land and boat days. Boat days offer the unforgettable experience of snorkeling and scuba diving either the third largest fringing barrier coral reef in the world, located less than a mile off Forfar's beach, or the nearby Tongue of the Ocean. Land days explore the unique landscape filled with seven distinct plant communities, the largest concentration of freshwater blue holes in the world, and the local culture from artisans and community members of Andros.

IFS is thrilled to be celebrating its 50th Anniversary in 2020 and stands committed to increasing accessibility to marine science education for local Androsians and US students of color. In celebration of our anniversary and commitment to increasing student opportunities, the Dr. Walter "Ben" Bohl Scholarship fund was established to support economically disadvantaged student field trips.

IFS promotes citizen science, scientist led research, and conservation efforts. IFS [partnered with the Smithsonian Marine Station](#) on a [National Science Foundation \(NSF\)](#) funded collaborative research project which examined the tropicalization of Western Atlantic seagrass beds. Forfar staff work with the local [Reef Rescue Network](#) to maintain a [coral propagation site](#), something students are often eager to see in action.

Contact: Becky Schmitthenner Program Coordinator 614-268-9930 office@intlfieldstudies.org



CICHAZ: Bringing Science and Service Together in Mexico

By Rhonda Struminger, Co-Founder and Co-Director

The Centro de Investigaciones Científicas de las Huastecas "Aguazarca" ([CICHAZ](#)) biological field station is nestled in the mountain town of Calnali, Hidalgo in the Sierra y Huasteca region of central Mexico. Co-Directors Dr. Gil Rosenthal and Dr. Rhonda Struminger founded CICHAZ in 2005 with two objectives in mind. First, support Dr. Rosenthal's research on the natural hybridization of swordtail fishes (*Xiphophorus*), livebearers that are a model for sexual behavior and evolution. Second, learn from and connect with the community through careful partnerships. The overall vision of [CICHAZ](#) being to establish a research, learning, and service center for the region.

Located in an area of abundant biological and cultural diversity, over the last 15 years CICHAZ has attracted hundreds of researchers and visitors, including Dr. Molly Schumer who is now Science Director at CICHAZ and also runs her own lab at Stanford. A National Science Foundation Long Term Research in Environmental Biology (NSF-LTREB) grant has enabled long-term studies of changes in the hybrid populations of swordtails, both in the wild and in artificial mesocosms. This work has helped the area become a well-known hybrid zone and it is on its way to becoming recognized as a *Xiphophorus* Biological Corridor which we hope will make conservation of critical areas possible throughout the region.

The station is in the final stages of renovation thanks to the support of an NSF-FSML (Field Stations and Marine Labs) grant. New features include solar panels and a modern molecular lab that makes it easier for scientists to do genetic research on site. Social scientists have also found a home at CICHAZ with researchers studying education policies, water use, and public goods in several local villages.

In partnership with local non-profit Asesoría Social Productiva, A.C. ([ASPac](#)), CICHAZ can sponsor annual outreach events including guided hikes featuring learning stations and summer camps. For those who journey to CICHAZ, there are opportunities for data collecting, gastronomic adventuring, and cultural exploring; we ask those who come when there are outreach events to share their expertise with the public. With the challenges of COVID-19 this past summer, we kept our distance but having ASPac on site made it possible to create a new hiking trail featuring educational signs, as well as capture footage for [Thevirtualfield.org](#) project. You can find us on Facebook (<https://www.facebook.com/Cichaz2005>) and Twitter (@CICHAZ1).



CICHAZ Main Building

In 2018 CICHAZ, along with ASPac and Fundación Siqueros Sin fronteras, A.C., sponsored [muralists](#) from South American and Mexico to paint homes and establishments along the main road of the Aguazarca neighborhood.

This Corredor Muralístico honors the culture and natural history of the area and the CICHAZ murals, done by Argentine muralist Sergio Herrera and Mexican muralist Jesús Rodríguez highlights the rivers and endemic fish that have been central to research at the field station.

Station Profile: Temple Ambler Field Station: A New Field Station Next Door to Philadelphia

By Amy L. Freestone, Director

Greetings from the Temple Ambler Field Station! Located just 40 minutes outside of Philadelphia, Pennsylvania, our campus was officially designated as a field station by Temple University in 2020, making us one of the newest field stations and OBFS members. Our 187-acre campus is a platform for environmental field research and education, providing access to a diversity of natural habitats including old growth and secondary forests, meadows, ephemeral streams, and our beautiful designed gardens. The Ambler Field Station also provides research and educational support facilities including laboratory and instructional spaces, offices for visiting scholars, conference rooms, dormitory accommodations, a fully equipped tech center, library, and field vehicle access.

The Temple Ambler Field Station serves both as an ecological observatory and as a platform for research across disciplines. Our research initiatives will document fundamental changes in our natural environments and provide these data as a publicly available resource to our community of researchers and educators. The Field Station also supports a cross-disciplinary array of research projects and centers, with investigations spanning environmental science to engineering.

The Temple Ambler Field Station is also a platform for experiential education, where students can get hands-on field-based research experiences to complement their academic training. We further leverage the enthusiasm and expertise of our citizen scientists to help gather information about our natural environments.

A priority of the Temple Ambler Field Station is to contribute to the effort to diversify participation in the sciences, and the Field Station focuses on providing access and opportunities to students from populations under-represented in science. Many populations of students, particularly those at urban universities, lack proximity to field stations and natural environments that can serve as a platform for education, thereby limiting their access to advanced field-based training. By leveraging the strengths of the Temple Ambler Field Station's location and assets, we are actively establishing research and educational opportunities and programming that promotes diversity in environmental fields.



For more information about the Temple Ambler Field Station visit: <https://ambler.temple.edu/research/temple-ambler-field-station> or find us on social media @tufieldstation.

RESEARCH NEWS

Motus Wildlife Tracking System: A collective effort for wildlife conservation By Amie MacDonald

Understanding the movement patterns of animals is an essential part of developing conservation strategies and implementing conservation actions where they are most needed. Migration ecology helps us determine where to direct limited resources, and the natural phenomenon of migration inspires and connects us across communities and continents in conservation. The Motus Wildlife Tracking System (*Motus* is Latin for movement) is a collaborative research network dedicated to studying the movement and behaviour of small flying animals. Motus is a program of Birds Canada, Canada's leading non-profit organization dedicated to bird and habitat conservation, in partnership with many collaborating researchers and organizations. Motus uses coordinated automated radio-telemetry arrays with receiver stations distributed across the landscape that detect animals marked with uniquely coded radio-transmitters by various researchers.

The biggest strength of Motus is its collaborative nature. Currently, it comprises over 850 stations on four continents managed by over 700 partners and collaborators. Over 20 000 animals have been tagged—mostly birds, but also bats and insects—and Motus data have been used in over 100 publications. The data are housed in Birds Canada's National Data Centre and presented to the public via the Motus website (www.motus.org).



To learn more about Motus and hosting a Motus station, visit www.motus.org or email motus@birdscanada.org.

Amie MacDonald is the Motus Coordinator, Western Canada, for Birds Canada.

Read the research paper at <http://www.ace-eco.org/vol12/iss1/art8/>.
Illustration: Birds Canada

MONK SEAL (*MONACHUS MONACHUS*) COLONY DISCOVERED BY TERRA SYLVESTRIS IN THE INNER IONIAN ARCHIPELAGO IN GREECE

<https://terrasylyvestrisreporter.blogspot.com/2019/11/press-release-monksealcolony-innerionian-greece-terrasylyvestris-first.html>

Learn more about Terra Sylvestris at <https://www.terrasylyvestris.org/home>

Osa Verde BioStation: A living laboratory of tropical conservation and research in the Costa Rican rainforest

By Hilary Brumberg, Ridge to Reef Program Interim Director, Osa Conservation

Deep within the tropical rainforest of Costa Rica--amidst troops of spider monkeys and flocks of scarlet macaws--lies the Osa Verde BioStation. The station was established over 10 years ago by [Osa Conservation](#), our international non-profit dedicated to conserving the globally-significant terrestrial and marine biodiversity of southern Costa Rica. As a living laboratory for ecology research and conservation, we offer hands-on experiences to researchers, students, volunteers and visitors from around the world. Our facilities protect 3,000 hectares of rainforest and provide easy access to primary and secondary forests, agricultural matrix, marine ecosystems and abundant biodiversity. We recently completed the construction of a [new state-of-the-art laboratory](#), funded by the National Science Foundation, and converted our former lab into a dynamic Rainforest Classroom to host student groups and researchers, including a [National Geographic Photography Camp](#) earlier this year.

Osa Verde BioStation is unique. In addition to providing a platform for researchers and students from all over the world to engage with science, we have our own large team of dedicated conservation scientists. Our science approaches conservation from diverse angles, encompassing citizen science, sea turtle rewilding, conservation technology, rainforest reforestation, coral reef restoration, community outreach, freshwater quality monitoring, and increasing capacity of national park rangers. Over the past few months, our conservation team has made huge strides ahead despite the global challenges we have all faced, including helping [execute the largest camera trap network in Central America](#), planting [over 16,000 native trees](#), locating rare and endangered trees during remote jungle expeditions, and connecting thousands of people to the Osa's nature and conservation through [virtual National Geographic classroom events](#) live from our BioStation.

To stay updated with our ongoing conservation initiatives, follow us on [Instagram](#), [Facebook](#) and [Twitter](#) @osaconservation.

Upper left: Osa Conservation Healthy Rivers Program works with local community. Photo Jo de Pauw.
Upper Right: NSF Lab exterior. Photo by Lucy Kleiner
2nd row left and right: rainforest classroom, photos by Lucy Kleiner
3rd row left: aerial of OSA Verde campus. Photo by Federico Pardo - National Geographic Explorer.
3rd row right: house wren nesting in bird box. Photo by Hilary Brumberg
Bottom row left: Tamandua in 2 year old Jobo tree Photo by Hilary Brumberg.
Bottom row right: Zander, great-grandson of riparian restoration landowner; photo by Batsu studio.

