2016 Annual Report

Bermuda Institute of Ocean Sciences

BIOS

Contents

Bermuda Institute of Ocean Sciences

Cover image: corals on the Great Barrier Reef. This page a reef in Palau. Photos by Eric Hochberg

BIOS

Letter from the Chair

When it comes to an organization like BIOS, with over 100 years of history, having anniversaries to celebrate is par for the course. The year 2016 presented such an occasion, with two of our education programs having reached important milestones. The Bermuda Program – our research internship program for Bermudian college students – celebrated its 40th year, epitomizing BIOS's long-standing commitment to on-island education; while one of our programs for U.S. university students celebrated its 25th anniversary, reflecting BIOS's international reputation and connectedness to the U.S. ocean sciences community.

Forty years ago, BIOS established the Bermuda Program to advance the education and practical training of Bermuda's students in the sciences. Then, as now, aspiring students were provided opportunities to participate in authentic research, working side-by-side with academics at the forefront of their field. Since 1976 more than 150 young Bermudians have taken part in the program, applying their summer experiences toward further university studies and, for some, careers as professional scientists. Many Bermuda Program participants have remained committed to using their science to benefit Bermuda, creating a manifold impact that lasts well beyond their summer experience at BIOS. Last year also marked the 25th anniversary of the U.S. National Science Foundation Research Experiences for Undergraduates (REU) program at BIOS. BIOS's involvement in this highly competitive program for U.S. university students reflects the organization's international reputation for high-quality ocean science research and the hands-on learning opportunities it provides to the next generation of scientific leaders.

As highlighted in this report, both of these educational programs – the Bermuda Program and the REU program – exemplify BIOS's deep roots within Bermuda's community while simultaneously reaching beyond the island's shores to make fundamentally important contributions internationally. Similarly, BIOS's research programs, while conducted locally, have tremendous relevance to global issues and have garnered the respect of the international ocean science community.

This year's annual report also features two new collaborative research programs that were launched in 2016. One of the programs, called BIOS-SCOPE, is built

 photo by Jorge Sanchez

BIOS

upon a long-standing ocean-measurement program that BIOS established almost 30 years ago. BIOS-SCOPE will focus research on the ocean's smallest life forms, breaking new ground in the study of marine microbes and proving once again that ocean exploration combined with innovative thinking and approaches is what ensures the longevity of BIOS's highly regarded ocean-measurement programs. The second program, CORAL, is a NASA-funded mission to provide a new perspective and fundamental understanding of global reef condition and function. CORAL leverages a state-of-the-art sensor, called PRISM, developed by NASA's Jet Propulsion Laboratory, to conduct airborne remote sensing campaigns across four coral reef regions. The result will be a set a empirical models that can be used by scientists around the world to estimate current reef condition and forecast how reefs may respond to changes in the world's ocean.

As stewards of this great organization, the trustees of BIOS take pride in the Institute's long-standing programs in both research and education. We honor that legacy not only through our dedication and commitment to continue these programs for decades to come, but also by continuously seeking ways to enhance these programs, making them even more relevant to today's challenges and opportunities, and affecting even greater positive change. As you read about the progress we made last year, I invite you to join us as we continue to shape BIOS's lasting legacy.

J. William Charrier

BIOS

Letter from the President & CEO

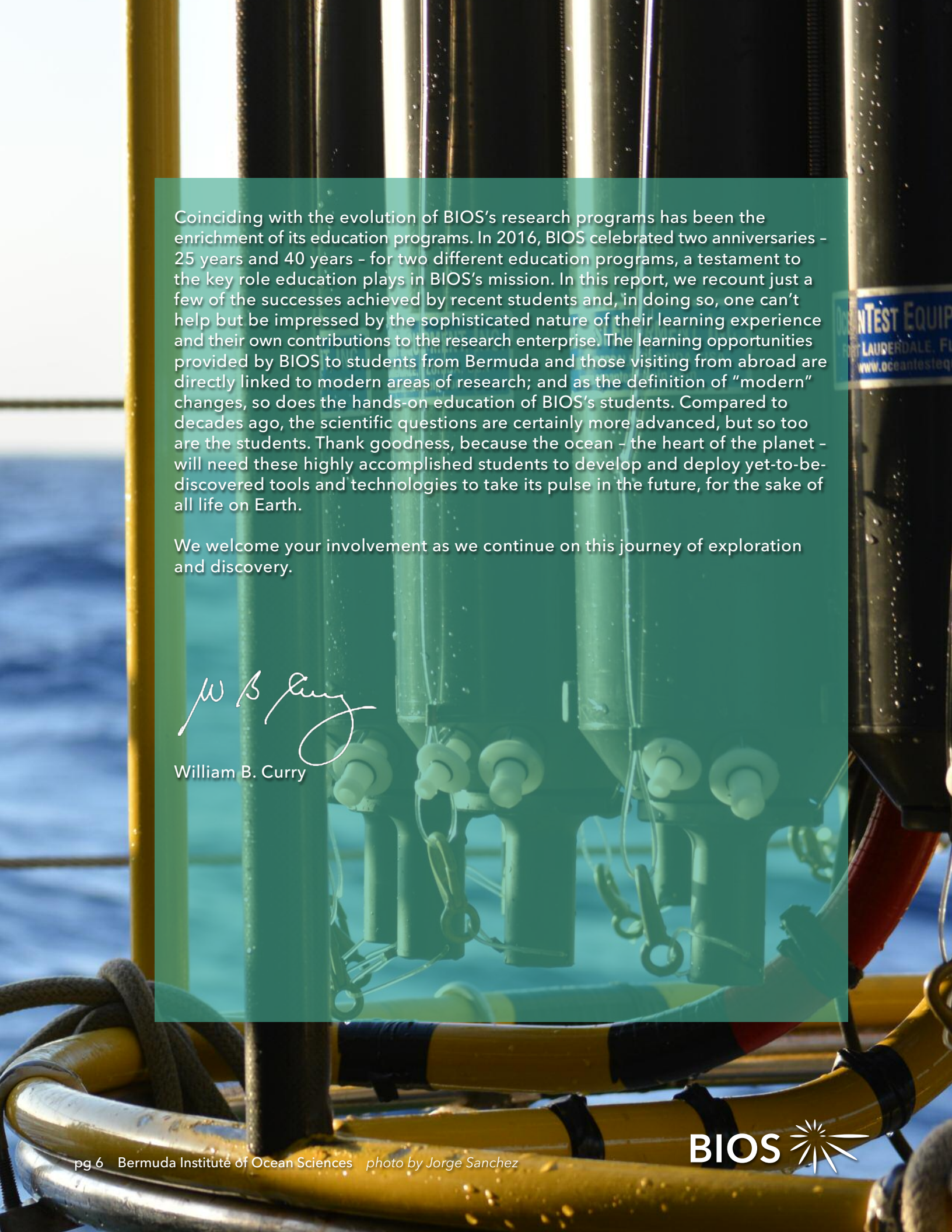
The ocean is often called the heart of the planet because it supports all life on Earth. At BIOS, we've been taking the pulse of the ocean longer than anyone through an ocean-measurement program that began in the 1950s. These mid-century measurements were the ocean's "vital signs" so to speak, providing insights into the ocean's basic physical state. Later, in the 1970s and 1980s, BIOS added to this basic physical check-up by routinely measuring dozens of chemical properties of the ocean – the equivalent of assessing the ocean's nutritional status, blood cholesterol levels, and other important indicators of health as one's doctor might do through a variety of tests. Now that we are in the genomic age, the ocean science community is honing new approaches that enable an even deeper assessment of the ocean and how it sustains life on Earth.

As described in this report, BIOS launched a new program in 2016 called BIOS-SCOPE that utilizes advanced molecular and genomic techniques to study marine microbes, the most diverse and abundant biological community in the ocean. As the ocean's smallest life forms, marine microbes have been difficult to study until recently; but due to BIOS's long-standing ocean-measurement programs, the waters offshore of Bermuda are one of the few locations in the global ocean where previous data, archived samples, and new research opportunities have converged to propel scientific understanding forward. The greatest progress may lie just ahead with new discoveries that surprise us, or alter our vision of how these vast living networks are organized, how they interact, and how they impact our planet's most basic life-sustaining processes.

In 2016, BIOS also took a leading role in a large research program aimed at assessing the health of coral reef systems. The COral Reef Airborne Laboratory (CORAL) investigation is a 3-year multi-institutional effort that will provide the clearest, most extensive picture to date of the condition of a large portion of the world's coral reefs. Expanding the data-collection method from in-water sampling to sophisticated aircraft-based remote sensing technology, CORAL will provide detailed assessments of the current health status of coral reefs as well as critical information about how reefs are responding to changing environmental conditions.

 photo by Jorge Sanchez

BIOS



Coinciding with the evolution of BIOS's research programs has been the enrichment of its education programs. In 2016, BIOS celebrated two anniversaries – 25 years and 40 years – for two different education programs, a testament to the key role education plays in BIOS's mission. In this report, we recount just a few of the successes achieved by recent students and, in doing so, one can't help but be impressed by the sophisticated nature of their learning experience and their own contributions to the research enterprise. The learning opportunities provided by BIOS to students from Bermuda and those visiting from abroad are directly linked to modern areas of research; and as the definition of "modern" changes, so does the hands-on education of BIOS's students. Compared to decades ago, the scientific questions are certainly more advanced, but so too are the students. Thank goodness, because the ocean – the heart of the planet – will need these highly accomplished students to develop and deploy yet-to-be-discovered tools and technologies to take its pulse in the future, for the sake of all life on Earth.

We welcome your involvement as we continue on this journey of exploration and discovery.

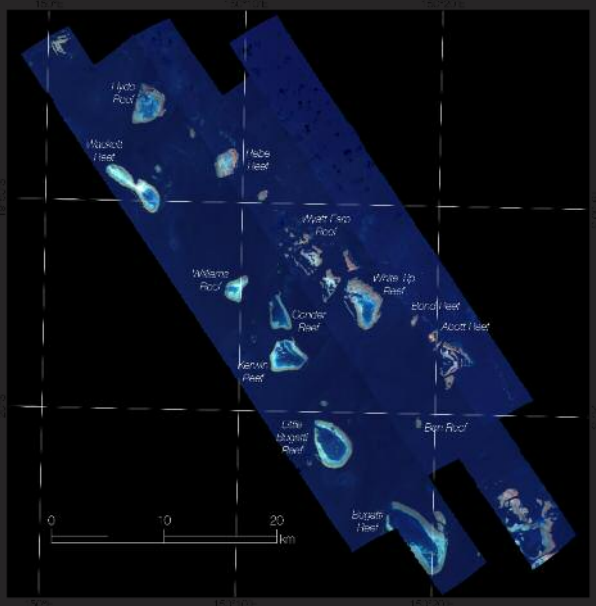
William B. Curry

BIOS

Leveraging Technologies

BIOS

A New Perspective on Reef Science



A mosaic of five PRISM flightlines in the Pompey sector of the Great Barrier Reef, showing complex shelf reef formations and substantial tidally-driven sediment resuspension.

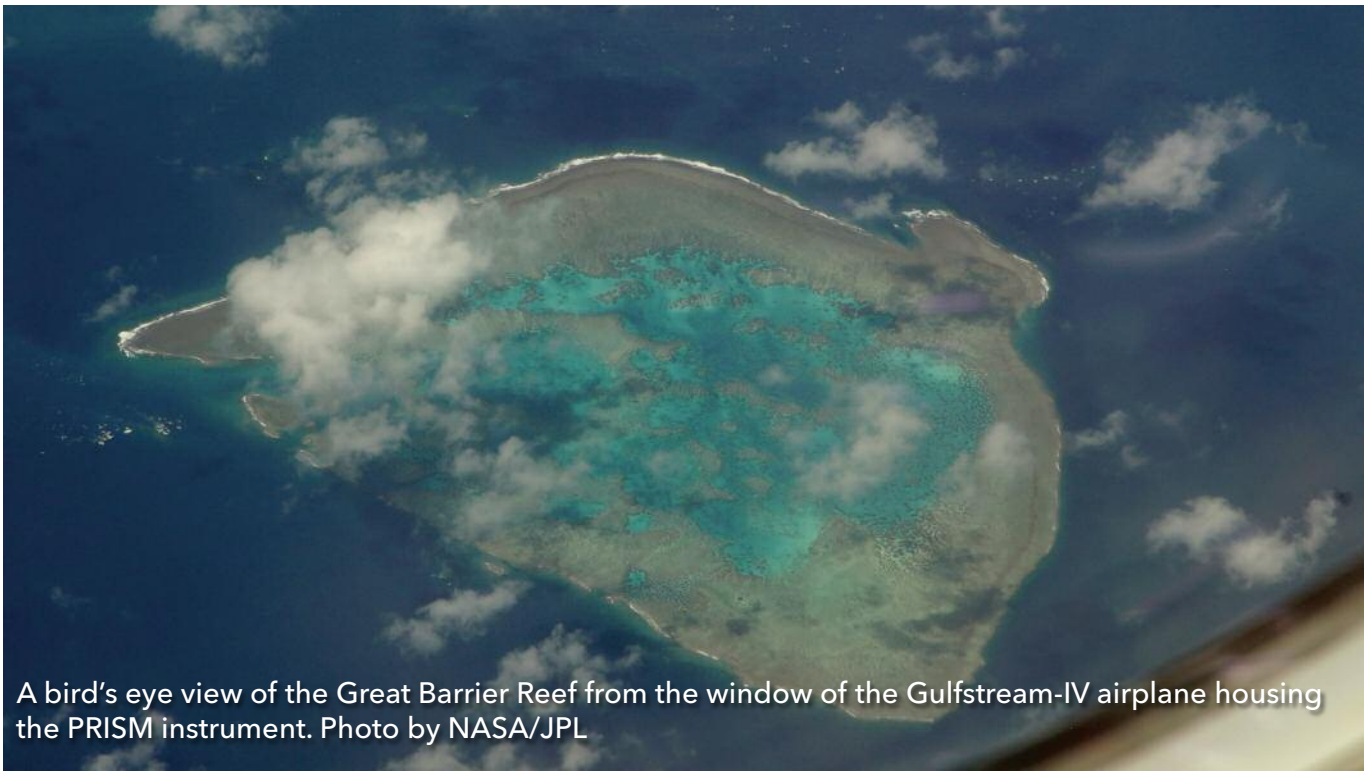
A three-year NASA field expedition started last year that uses advanced airborne instrumentation, combined with in-water validation measurements, to survey more of the world's coral reefs, and in far greater detail, than ever before.

The COral Reef Airborne Laboratory (CORAL), funded by the NASA Earth Venture Suborbital II Program, will provide critical data and new models needed to analyze the status of coral reefs and to predict their future. And, unlike previous studies and surveys, CORAL will produce the first uniform global data set aimed at understanding reef function at an ecosystem-scale.

Corals are a crucial part of Earth's ecosystems and many global societies and economies, but they are typically studied during diving expeditions using a variety of data collection techniques. This means that many reefs have never been surveyed, and few in a uniform manner that allows for comparison between data sets.

"We know reefs are in trouble," said Eric Hochberg, BIOS coral reef scientist and CORAL principal investigator. "However, reefs respond in complex ways to environmental stresses such as sea level change, rising ocean temperatures and pollution. The data we currently have available were not collected at the appropriate spatial scale and density to allow us to develop an overarching, quantitative model that describes why and how reefs change in response to environmental changes. We need accurate data across many whole reef ecosystems to do that."

CORAL began its fieldwork in June 2016 with an Operational Readiness Test (ORT) at the Hawaii Institute of Marine Biology on Coconut Island in Hawaii. With refined operational plans, field survey and measurement methods, and communication protocols, the team spent six weeks in September and October surveying northern and southern portions of the world's largest reef structure—Australia's Great Barrier Reef, portions of which have been subjected to extreme bleaching events in the last year. In February and March 2017 the teams redeployed



A bird's eye view of the Great Barrier Reef from the window of the Gulfstream-IV airplane housing the PRISM instrument. Photo by NASA/JPL

to Hawaii to survey the main Hawaiian islands (the Big Island, Kauai, Maui, Molokai, Lanai, and Oahu), followed shortly by campaigns in Palau and the Marianas (April and May).

The science underpinning CORAL is based on the use of an airborne instrument housed in the belly of a Gulfstream IV airplane: the Portable Remote Imaging Spectrometer, or PRISM. Developed by NASA's Jet Propulsion Laboratory, the PRISM sensor is a combination spectrometer (that measures light intensity as a function of wavelength) and radiometer (that measures the power of electromagnetic radiation) designed to survey large areas of the coastline in a short period of time. For the purposes of CORAL, PRISM will measure the light values (spectra) that signal the health of the coral and the composition of the bottom community (i.e., sand, algae, or coral).

CORAL scientists will then apply a series of "corrections," or mathematical algorithms, to the PRISM data to account for factors that influence how light travels through the atmosphere and water column. Data to develop and refine these corrections are collected through in-water *(in-situ)* validation activities during each field campaign, with teams measuring water optical properties, benthic cover, and reef biogeochemistry.

Combining PRISM data with *in-situ* measurements and corrections will result in a series of maps that indicate the relative densities of coral, sand and algae in each study area, as well as rates of primary productivity (the creation of new organic material) and calcification (the process by which reefs produce calcium carbonate, an important determinant of reef ecosystem health). With these maps, the CORAL team can build models to help scientists, resource managers and politicians gain a new perspective on reef function and better predict how natural and human processes will shape the future of reefs.

Despite being the first comprehensive study of its kind, CORAL will still only cover 3 to 4 percent of the world's reefs. "Ideally, in a decade or so, we'll have a satellite that can frequently and accurately observe all of the world's reefs, and we can push the science—and, most importantly our understanding—even further," Hochberg

Cross-disciplinary Collaborations

 photo by Jorge Sanchez

BIOS

An international team of scientists sets its sights on the ocean's smallest residents

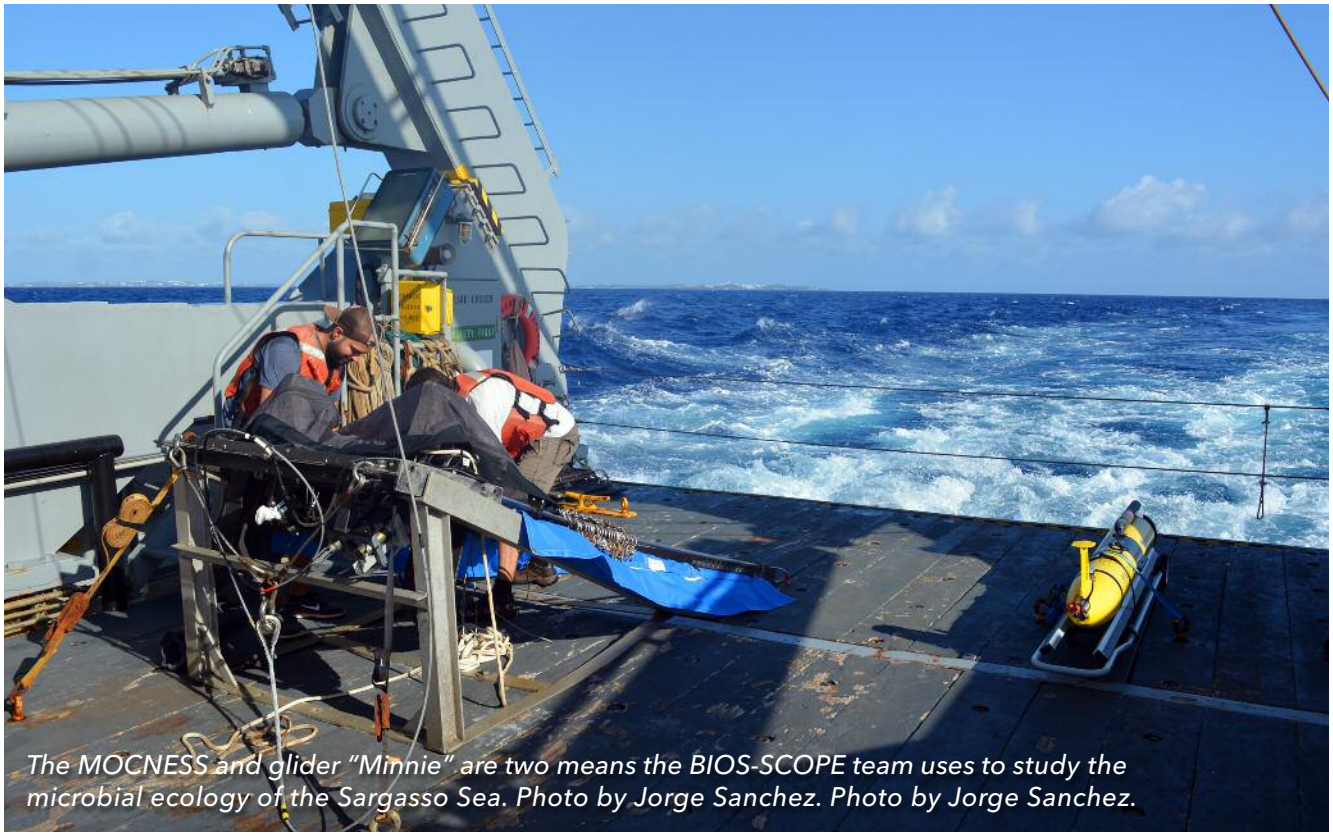
BIOS-SCOPE team members Krista Longnecker, Leo Blanco-Bercial and Craig Carlson. Photo by Jorge Sanchez.

An interdisciplinary team of scientists joined forces in July for their first annual research cruise dedicated to revealing how specific microbes take up and transform organic matter within a web of ecological interactions in the waters southeast of Bermuda.

These oceanographers, molecular biologists, and marine chemists are working together to study the microbial ecology of the Sargasso Sea through the BIOS-SCOPE (Bermuda Institute of Ocean Sciences – Simons Collaboration on Ocean Processes and Ecology) program, which was established in 2015 with the support of Simons Foundation International, Ltd.

In the Sargasso Sea, an astonishing array of single-celled, microscopic organisms are locked in competition to consume limited nutrients. These microbes grow so rapidly, and are so abundant, that their demand for nutrients changes the chemistry of the ocean on a scale that impacts Earth's climate, and the invisible chemical transactions that occur as they grow, eat, and become food for others can ripple up the marine food chain. While a single microbe is of little consequence, when taken together, the trillions of microbes in the ocean play a significant role in the global carbon cycle. Photosynthetic bacteria remove carbon dioxide from the water, transforming it into organic molecules, while other microbes feed on organic matter and release carbon back into the biosphere through waste products.

To explore these ecological processes, the BIOS-SCOPE program assembled scientists from



The MOCNESS and glider "Minnie" are two means the BIOS-SCOPE team uses to study the microbial ecology of the Sargasso Sea. Photo by Jorge Sanchez. Photo by Jorge Sanchez.

Bermuda, the U.S., and Canada representing BIOS, the University of California Santa Barbara (UCSB), Oregon State University (OSU), the University of Georgia, the University of Exeter, and the Woods Hole Oceanographic Institution (WHOI). They are collaborating to discover the identities of microbes, zooplankton, and the chemical compounds they consume and produce on a daily basis.

Dissolved organic matter, often referred to as "DOM," is a catch-all term for tens of thousands of unique organic compounds that abound in seawater but are too small to be caught on a filter. On a global scale, DOM plays an important role in the carbon cycle: the amount of carbon contained in the ocean's DOM rivals the amount of carbon stored in atmospheric carbon dioxide, and a portion of the ocean's DOM that is unpalatable to microbes can be stored in the deep sea for thousands of years.

"We want to identify the organisms involved at different depths and how they respond and transform DOM," said Craig Carlson, a UCSB professor and BIOS adjunct scientist who leads the BIOS-SCOPE program. "To do that we have assembled a team that studies microbial processes in the context of oceanographic measurements and further couples high resolution molecular, chemical and genomic approaches. And we don't just want the broad distribution patterns of dissolved organic matter, but also the specific kinds of organic matter that are acted upon by distinct microbial populations."

Larger forms of marine life can also impact microbes in the ocean, as animals take in food and oxygen and generate waste. Like airplanes that leave contrails in the sky, scientists suspect tiny crustaceans leave trails of waste as they swim up and down in the water every day, redistributing nutrients and creating transient smorgasbords for microbes.

Assistant Scientist Amy Maas back at the lab. Photo by Tiffany Wardman.

BIOS scientists Amy Maas and Leo Blanco-Bercial are investigating these migrating zooplankton and the DOM they produce at different depths throughout the course of each day. Using a new tool acquired specifically for the BIOS-SCOPE project, called the Multiple Opening/Closing Net and Environmental Sampling System (MOCNESS), Mass and Blanco-Bercial are able to sample zooplankton at discrete depths while sensors mounted on the net's frame record environmental characteristics of their various habitats.

Ultimately, every organism is important to the BIOS-SCOPE team. Taken together, they constitute the eating, breathing, and waste-producing community of animals inhabiting a particular depth at a particular moment, producing DOM and influencing the community of microbes that live and die there.

The BIOS-SCOPE project also tapped BIOS's trio of remotely operated gliders, operated by BIOS oceanographer Ruth Curry, to record changing chemical and physical parameters and mirror the path of zooplankton nets towed behind the ship during the July research cruise. Subsequent glider missions will provide valuable layers of information about the structure of currents, particles, and zooplankton in the water based on how they reflect sound waves back to the instrument.

"Every project within BIOS-SCOPE is synergistic with all the rest," said Carlson. "I think this broader vision makes it possible to build a picture that is greater than the sum of its parts, and to push the scientific cutting edge forward."

Education Milestones and Anniversaries

 photo by Ali Hochberg

BIOS

BIOS training leads to diverse careers in marine and atmospheric sciences, and beyond

4th year Bermuda Program intern, JD Symonds, teaches diving skills to summer students.

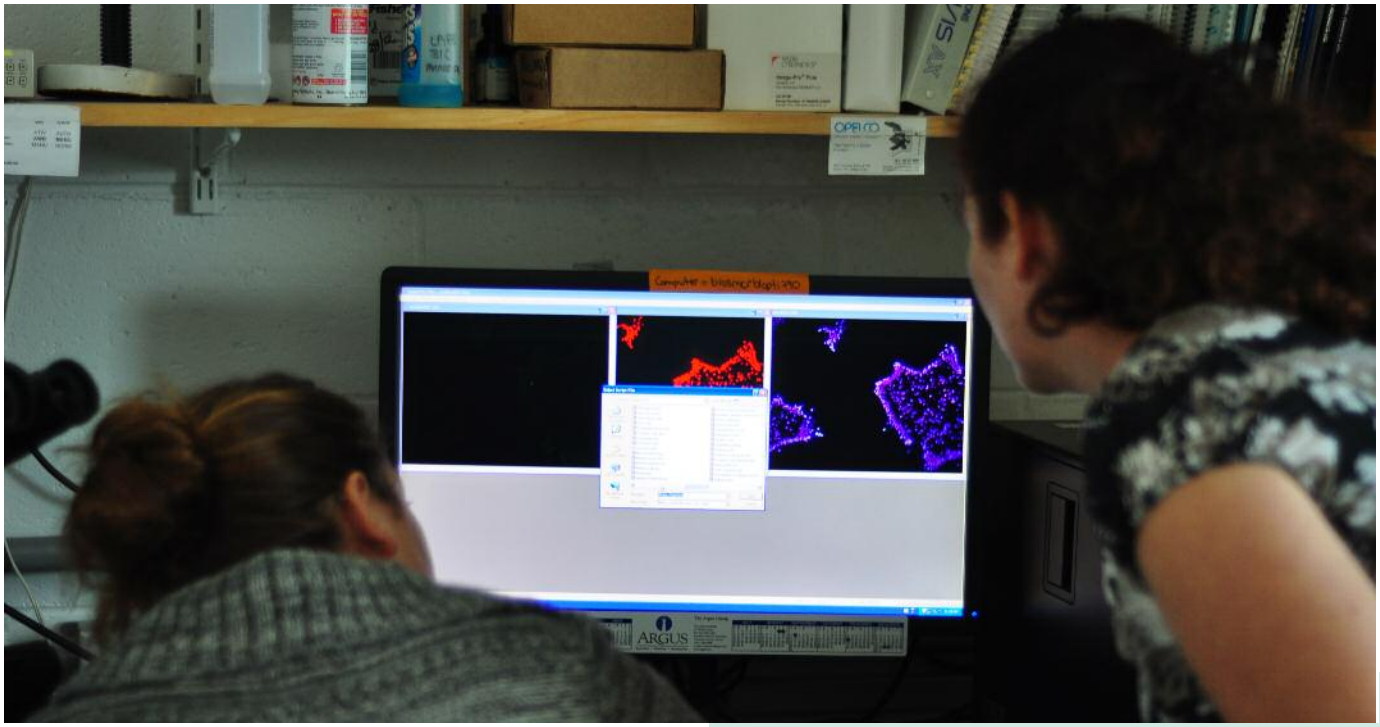
In 2016, two educational programs at BIOS celebrated milestone anniversaries.

While BIOS has been providing experiential learning and research opportunities to students since its founding more than 100 years ago, the following two formal programs are nevertheless a testament to BIOS's long-standing commitment to both Bermudian students and those visiting from abroad.

Since its inception 40 years ago, the Bermuda Program at BIOS has provided more than 150 Bermudian college students with a paid summer internship and practical experience in marine or atmospheric research. While the program has evolved over time to meet the changing needs of students, it has always provided skill sets that open doors, not only within marine science careers, but also into careers spanning law, finance, policy, education, and human health.

With respect to catalyzing careers in science, one can see the positive impact of the program in BIOS's own staff. For example, Rachel Parsons has been a member of the BIOS research team since 1994, but was formerly a Bermuda Program intern in 1988 and 1989. During that time she worked on water chemistry measurements around the Bermuda platform and on the inaugural Bermuda Atlantic Time-series Study (BATS) measurements, now one of the most highly regarded ocean-measurement programs in the world.

Today, Parsons runs the Microbial Ecology Lab at BIOS, which investigates the microbial communities at the BATS site, in addition to other sites, using a variety of advanced molecular techniques and state-of-the-art microscopy capable of facilitating analysis at

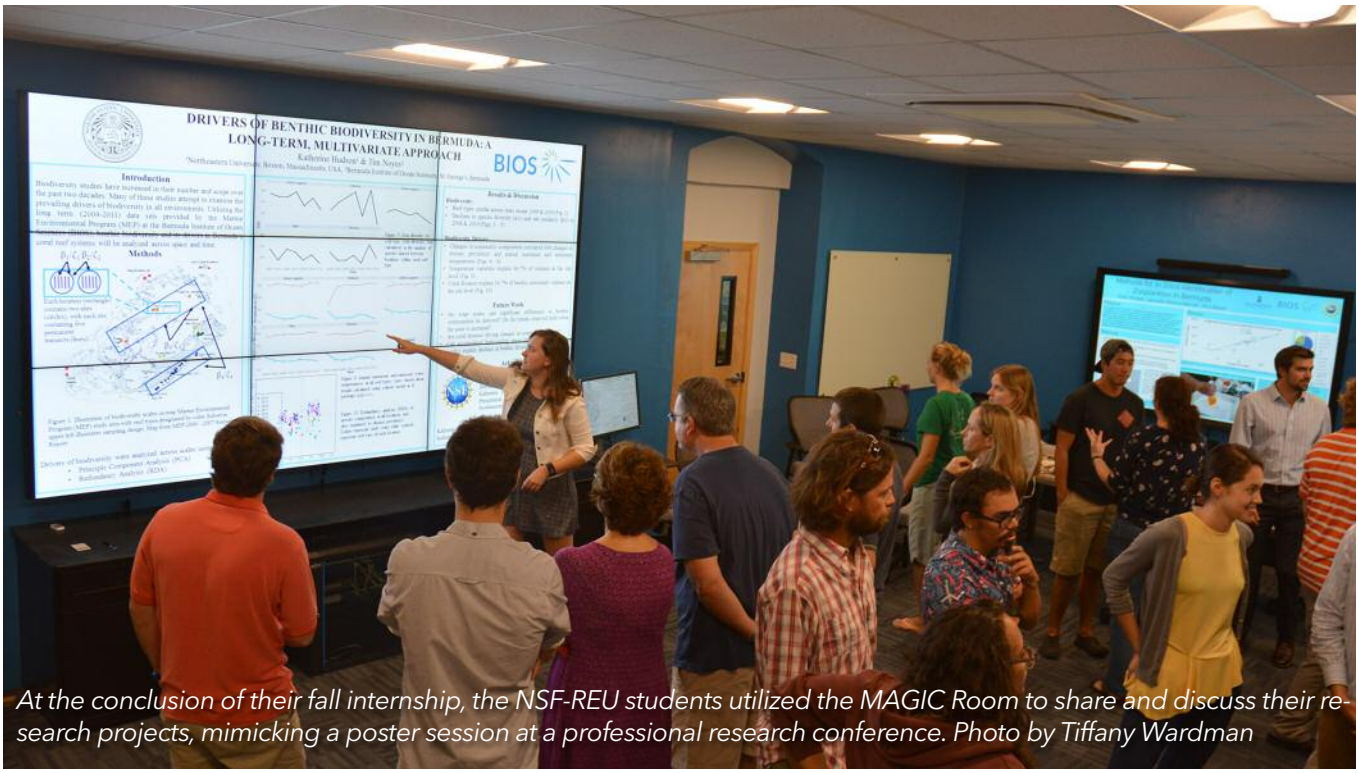


the cellular level. These same techniques are often used in medical research labs, and many of the students Parsons has mentored during her career at BIOS have gone on to careers in medicine, health, and biomedical research.

Dr. Lisa Boden was a Bermuda Program intern in 1989 and 1991. She is currently a veterinary epidemiologist with a background in medical law and ethics. Her research focuses on the delivery of evidence to support animal health and welfare policy in Scotland. Lisa received a liberal arts degree from Dartmouth College in the U.S., and then trained as a veterinary surgeon at the University of Queensland in Australia. She subsequently completed a PhD in veterinary epidemiology (of racehorse fatalities) at the University of Melbourne and also holds a Masters of Laws in medical law and ethics from the University of Edinburgh.

"The Bermuda Program probably was the first time I realized that research was something I really enjoyed and wanted to be part of in the future. It is a very special opportunity for Bermudians to experience and be part of every-day work in a world-class research facility."
– Dr. Lisa Boden, Senior Research Fellow of Veterinary Pathology, Public Health & Disease Investigation, University of Glasgow.

NSF-REU intern Petra Byl (pictured right) worked in the lab and in the field to carry out her research project at BIOS on marine microbes. During her internship, Petra investigated microbial communities in the oxygen minimum zone (OMZ) of Devil's Hole, a submerged sinkhole in Harrington Sound, Bermuda. As OMZs expand in the global ocean due to climate change, model systems like Devil's Hole provide natural laboratories for the study of microbial lineages and their role in mediating sulfur, nitrogen, and carbon cycles. Petra is a student at the
University of Chicago working toward a B.S in geophysical sciences, and was one of eight NSF-



At the conclusion of their fall internship, the NSF-REU students utilized the MAGIC Room to share and discuss their research projects, mimicking a poster session at a professional research conference. Photo by Tiffany Wardman

In 2016, the NSF-sponsored Research Experiences for Undergraduates (REU) program celebrated its 25th year at BIOS.

This program is designed to provide a semester-long, rigorous research experience enhanced by field trips on land and at sea, culminating in a final, formal presentation to faculty and staff. Since 1991, nearly 200 U.S. university students have participated in a variety of REU projects, with themes ranging from climate change to coral reef ecology. For some, their research at BIOS leads to presentations at international conferences and/or co-authorship of peer-reviewed journal publications. In addition to providing hands-on research experience, the program also gives students practical skills and advice with respect to preparing a curriculum vitae, applying to graduate school, and sharpening written and oral communication skills.

As BIOS celebrated the longevity of the Bermuda Program and the REU program, it also opened a new venue to facilitate both learning and research called the MAGIC Room. As part of the Mid-Atlantic Glider Initiative and Collaboration (MAGIC) launched at BIOS in 2014, the MAGIC Room is a modern data-gathering and information-sharing facility designed to facilitate data analyses, scientific collaboration, and learning among students and visitors from Bermuda and abroad. Thanks to private support, BIOS renovated a portion of the Institute's existing library to create the MAGIC Room, transforming a 45-year-old room that had been used for traditional research and study into a modern hub of activity that was put to immediate use upon the room's completion in summer 2016.

Selected Financial Highlights Overview

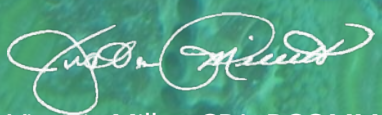
The Bermuda Institute of Ocean Sciences is pleased to present our 2016 fiscal year financial statements. In 2016 BIOS conducted a wide array of scientific research projects as part of its core mission, supported by competitive grants and contracts representing nearly two-thirds of the Institute's total income. As the Institute sought new opportunities to leverage its strengths and further its key strategic priorities, the management and board of trustees continued to monitor fiscal and administrative operations to achieve operational efficiencies.

SELECTED HIGHLIGHTS

- BIOS continues to have a strong balance sheet. As of December 31, 2016, total assets were $36.6M, total liabilities were $7M and total net assets were $29.6M.
- Overall revenue in 2016 was lower than the prior year but nevertheless favorable, with an increase of $1.5M over the prior year in income from grants and contracts. Grants and contracts contributed 63% of total income in 2016, compared to 40% in the prior year.
- BIOS's endowment was valued at $13.7M at year's end. The time-weighted rate of return on the endowment was 3.7% in 2016, a significant improvement over the performance in 2015. The 2016 endowed-fund distribution totaled $715K in support of research (47%), education (35%) and unrestricted functions (18%).
- Total operating expenses increased over the prior year at $16.1M of which 92% directly supported BIOS's research and education programs.

SUMMARY AND OUTLOOK

In order to maintain our status as a world-class scientific organization, BIOS remains committed to the pursuit of excellence in both research and education. With the recruitment of new scientists to our faculty in recent years and the launching of several new and ambitious research programs, the Institute will continue to pursue asset growth from federal and private sources to support its activities. Infrastructure improvements initiated recently will continue in 2017, to enhance BIOS's research, education, and outreach programs and the fulfillment of the Institute's mission.



Victoria Millett CPA, BCOMM
Treasurer and Controller
Please visit www.bios.edu/about/annual-reports/ for a full financial report.

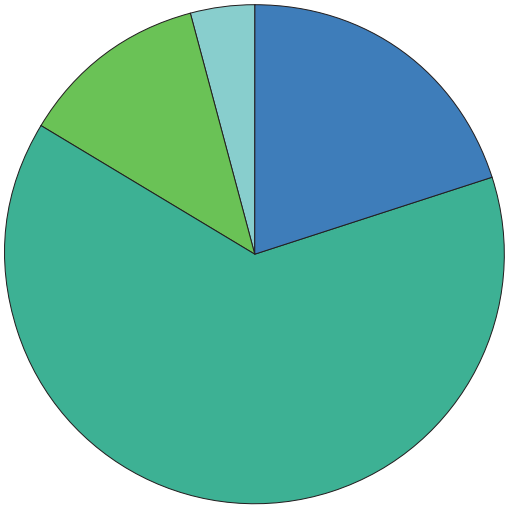
Summary Financial Highlights

December 31, 2016

2016 REVENUES & SUPPORT

Revenue and support is derived from gifts; individual, corporate and foundation donors (20%); and grants and contracts received through the U.S. and Bermuda governments (64%). Additional sources of support are tuition and fees for the use of BIOS's various scientific, marine and housing facilities and attendance at our many educational programs (12%), and investment return pertaining to Endowment Funds (4%).

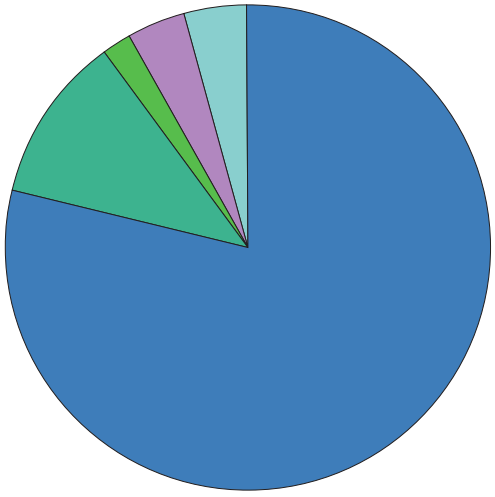
- Contributions
  $2,739,139 (20%)
- Government, Corporate Contracts and Grants
  $8,554,388 (64%)
- Tuition, Guest Services and Other Income
  $1,686,694 (12%)
- Investment Return
  $514,169 (4%)



2016 EXPENSES

Program expenses include scientific research (79%); education activities (11%); and guest and residential services (2%). Other expenses include development, marketing and communication (4%) and management and general (4%).

- Scientific Research
  $12,792,629 (79%)
- Education Programs
  $1,843,847 (11%)
- Guest and Residential Services
  $225,332 (2%)
- Development and Communications
  $653,720 (4%)
- Management and General
  $641,645 (4%)



Summary Financial Highlights

December 31, 2016

Statements of Financial Position

	2016	2015
Assets		
Cash and cash equivalents	$ $855,045	$ 2,446,303
Grant receivables and other assets	780,567	725,862
Contributions receivable, net	4,454,992	5,065,125
Investments	14,504,921	14,182,476
Property and equipment, net	16,034,500	16,100,305
Total Assets	$ 36,630,025	$ 38,520,071
Liabilities and Net Assets		
Liabilities		
Payables, accruals, advances and deposits	$ 1,552,033	$ 1,035,238
Loans payable	5,458,368	5,202,427
Total Liabilities	7,010,401	6,237,665
Net Assets		
Unrestricted	$ 9,746,051	$ 11,255,421
Temporarily restricted	10,093,625	11,272,387
Permanently restricted	9,779,948	9,754,598
Total Net Assets	29,619,624	32,282,406
Total Liabilities and Net Assets	$ 36,630,025	$ 38,520,071

Statements of Activities

Support and other Revenues		
Contributions	$ 2,739,139	$ 8,331,734
Grants and Contracts	8,554,388	7,061,403
Tuition, guest services and other income	1,686,694	2,304,919
Investment return	514,169	(250,230)
Total Revenue and Other Support	13,494,390	17,447,827
Expenses		
Program services		
Scientific research	$ 12,792,629	$ 9,134,943
Education courses and programs	1,843,847	2,052,412
Guest and residential services	225,332	297,116
Total Program Services	14,861,808	11,484,471
Support Services		
Development, marketing and communications	$ 653,720	$ 577,168
Management and general	641,645	837,531
Total Support Services	1,295,365	1,414,699
Total Expenses	16,157,173	12,899,170
(Decrease) Increase in Net Assets	$ (2,662,783)	$ 4,548,657

 photo by Stacy Peltier

BIOS

Summary Financial Highlights

December 31, 2016

	2016	2015
Investments		
Commonfund Global Multi Asset Portfolio LLC	$ 13,753,216	$ 13,928,656
Vanguard Federal Money Market Fund	751,705	-
Vanguard Prime Money Market Fund	-	253,819
Total	$ 14,504,921	$ 14,182,476
Endowments		
Balance on January 1	$ 13,910,141	$ 14,817,400
Contributions	25,350	27,664
Investment return		
Net appreciation (depreciation)	329,819	(431,385)
Income (interest & dividends)	182,436	180,654
Distributed during the year	(715,353)	(684,192)
Balance on December 31	$ 13,732,393	$ 13,910,141
Represented on the Balance Sheet as:		
Unrestricted	$ 1,306,173	$ 1,344,297
Temporarily restricted	2,646,272	2,811,246
Permanently restricted	9,779,948	9,754,598
Total	$ 13,732,393	$ 13,910,141

 photo by Stacy Peltier

BIOS

Leadership
Faculty & Staff

 Photo by Eric Hochberg

BIOS

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Postdoctoral Researcher, Yvonne Sawall, sets up the flumes as part of the CORAL project. Photo by Tiffany Wardman

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Justin Smith
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Jeremiah Brower
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Nick Mathews
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Orson Hyde (Relief)
Howard Chen (Relief)
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Staff and crew of the research vessel Atlantic Explorer. Photo by Tiffany Wardman

R/V ATLANTIC EXPLORER

George W. Gunther
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Courtney Barber III
Gary Ramos
Angelica Mendez
Larry Morris
Relief Mates

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Bob Cruise (Relief)
Joseph E. Howard (Relief)
Chief Engineer

John Crofts (Relief)
Able Seaman

Bobbie Bixler (Relief)
Randal Hughes (Relief)
Teresa MacMartin (Relief)
Relief Cooks

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Mel June Inocencio
1st Officer

Berlin Jamelo
Rodney Jumeras
Alchamor Soliva
Motormen

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Victoria Millett
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Sharon Minors
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Donika O'Mara
Office/Room Attendants

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Carol A. Pitcher
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Vanessa Shorto
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Helena Simoes
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Antar Smith
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Jeremy Smith
Painter/General Maintenance

Sandy Spurling
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Wilfred J. Stovell
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Bruce Williams
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Electrician/Plumber

Kenneth E. Trott
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