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Bermuda Institute of Ocean Sciences

Cover image: corals on the Great Barrier Reef. This page a reef in Palau. Photos by Eric Hochberg
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
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 of 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
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.
Cooming 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
Leveraging Technologies
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
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
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...
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.
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
BIOS training leads to diverse careers in marine and atmospheric sciences, and beyond

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 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.

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.

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-
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.
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.
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

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<td><strong>Total Liabilities and Net Assets</strong></td>
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#### Statements of Activities

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<td>Grants and Contracts</td>
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<td>Tuition, guest services and other income</td>
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<td><strong>(Decrease) Increase in Net Assets</strong></td>
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<td>($2,662,783)</td>
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### Investments

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### Endowments

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<td>Investment return</td>
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<td>Net appreciation (depreciation)</td>
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<td>(431,385)</td>
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<td>Income (interest &amp; dividends)</td>
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<td>Distributed during the year</td>
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<td>(684,192)</td>
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<tr>
<td>Balance on December 31</td>
<td><strong>$13,732,393</strong></td>
<td><strong>$13,910,141</strong></td>
</tr>
</tbody>
</table>

Represented on the Balance Sheet as:

- **Unrestricted**
  - $1,306,173
- **Temporarily restricted**
  - $2,646,272
- **Permanently restricted**
  - $9,779,948

**Total**
- $13,732,393

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*Summary Financial Highlights*  
December 31, 2016

*Photo by Stacy Peltier*
Leadership
Faculty & Staff
Board of Trustees

OFFICERS

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J. William Charrier

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Mr. John Rankin (from December 2016)

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William H. Williams

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William B. Curry, PhD

Chief Financial and Operating Officer
William Welton

Treasurer and Controller
Victoria Millett

Secretary
Gillian M.S. Hollis

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United States

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Woods Hole Oceanographic Institution
Woods Hole, MA

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Potomac, MD

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University of Delaware

Rita R. Colwell, PhD
University of Maryland

John W. Farrington, PhD
Woods Hole Oceanographic Institution
Woods Hole, MA

Diana H. Frazier
FLAG Capital Management, LLC
Stamford, CT

James N. Galloway, PhD
University of Virginia
Charlottesville, VA

Linda K. Glover
GloverWorks Consulting
Alexandria, VA

Paul Hanle, PhD
Climate Central
Princeton, NJ

Dennis Hansell, PhD
Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
Miami, FL

Gary H Isaksen, PhD
Exxon Mobil Exploration Co
Houston, TX

Alan H. McGowan
Eugene Lang College, The New School for Liberal Arts
New York, NY

William Russel, PhD
Princeton University
Princeton, NJ

Burt Singer, PhD
University of Florida
Gainsville, FL

Deborah K. Steinberg, PhD
Virginia Institute of Marine Science
Gloucester Point, VA

Bess Ward, PhD
Princeton University
Princeton, NJ

Anthony Williams
Dentons US LLP
New York, NY

Canada

Michael A. Butt
Buttcon Limited
Concord, Ontario

Europe

Lady (Judy) Vereker
London, U.K.

Bermuda

Colin Brown
CHUBB
Hamilton

Michael Collins
Bank of NT Butterfield
Hamilton

Graham Collis
Conyers, Dill and Pearman Ltd.
Hamilton

Charles Cooper
XL Caitlin
Hamilton

Brian Duperreault
Hamilton Insurance Group
Paget

Richard J. Ferret
Tucker’s Town
Postdoctoral Researcher Yvonne Sawall, sets up the flumes as part of the CORAL project. Photo by Tiffany Wardman

Michael D. Hamer, PhD
Camford Atlantic Ltd.
Smith’s

Idwal Wyn Hughes, PhD
Hamilton Parish

Christopher Maybury
Tucker’s Town

Brian M. O’Hara
Paget

Jonathan F. Reiss
Hamilton Insurance Group
Hamilton

Ralph E. Richardson
Sandy’s

The Honorable Gerald D.E. Simons, OBE
Pembroke

James N. Stanard, PhD
Paget

Ian Strecker
Warwick

William H. Williams
Warwick

TRUSTEE EMERITUS

Michael A. Butt, OBE
Hamilton Parish

Robert E. Cawthorn
Warwick

John Farrington, PhD
(from May 2016)
Woods Hole, MA

Raymond E. Moore
Pembroke

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Neil R. Andersen, PhD
Foster Bam
Rosamond H. Butler

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Frederick J. Kollmorgen
Cindy Lee, PhD
H. Eugene Lehman, PhD
Frederick T. Mackenzie, PhD
Frank B. Sprow, PhD
Talbot H. Waterman, PhD
W. Redwood Wright, PhD

Bermuda
James Burnett-Herkes, PhD
John R.H. Lightbourn
Terry E. Lister, JP, MP
Mr Ray Moore (from May 2016)
Wendell M. Smith
Richard D. Spurling
Brunell Spurling
David B. Wingate, PhD, OBE

Canada
Michael L. Davies

Europe
F. Geoffrey Larminie
Robert T. Sperring
## Faculty & Staff

### Research

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicholas R. Bates, PhD</td>
<td>Associate Scientist</td>
<td>Scienic Director and Research Specialist</td>
</tr>
<tr>
<td>Rodney J. Johnson, PhD</td>
<td>Assistant Scientist</td>
<td>Senior Scientist and Associate Director of Research</td>
</tr>
<tr>
<td>Fredric Lipschultz, PhD</td>
<td>Senior Scientist</td>
<td>Leocadio Blanco-Bercial, PhD</td>
</tr>
<tr>
<td>Amy Maas</td>
<td>Assistant Scientist</td>
<td>Andrea G. Bodnar, PhD</td>
</tr>
<tr>
<td>Kevin Mayall, PhD</td>
<td>Research Technician</td>
<td>Maureen H. Conte, PhD</td>
</tr>
<tr>
<td>Natasha McDonald</td>
<td>Research Specialist</td>
<td>Ruth Curry</td>
</tr>
<tr>
<td>Matthew P. Enright</td>
<td>Research Technician</td>
<td>Samantha J. de Putron, PhD</td>
</tr>
<tr>
<td>Tim Noyes</td>
<td>Research Specialist</td>
<td>Keven Neely</td>
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<tr>
<td>Rebecca Garley</td>
<td>Research Technician</td>
<td>Keptal Mayall, PhD</td>
</tr>
<tr>
<td>Matthew P. Enright</td>
<td>Research Technician</td>
<td>Natasha McDonald</td>
</tr>
<tr>
<td>Fernando Pacheco</td>
<td>Research Specialist</td>
<td>Keven Neely</td>
</tr>
<tr>
<td>Rachel J. Parsons</td>
<td>Research Technician</td>
<td>Tim Noyes</td>
</tr>
<tr>
<td>Gretchen Goodbody-Gringley, PhD</td>
<td>Research Technician</td>
<td>Samantha J. de Putron, PhD</td>
</tr>
<tr>
<td>Andrew J. Peters, PhD</td>
<td>Associate Scientist</td>
<td>Norman B. Nelson, PhD</td>
</tr>
<tr>
<td>Mark Guishard, PhD</td>
<td>Science Program Manager, Risk Prediction Initiative</td>
<td></td>
</tr>
<tr>
<td>Sam Stevens</td>
<td>Research Technician</td>
<td>Philippe Rouja, PhD</td>
</tr>
<tr>
<td>John Wardman, PhD</td>
<td>Science Program Coordinator, RPI</td>
<td>Struan R. Smith, PhD</td>
</tr>
<tr>
<td>Matt Hayden</td>
<td>Research Technician</td>
<td>Deborah Steinberg, PhD</td>
</tr>
<tr>
<td>Luna Hiron</td>
<td>Research Technician</td>
<td>Wolfgang Sterrer, PhD</td>
</tr>
</tbody>
</table>

### Adjunct Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andreas J. Andersson, PhD</td>
<td></td>
<td>Scripps Institution of Oceanography</td>
</tr>
<tr>
<td>Craig Carlson, PhD</td>
<td></td>
<td>University of California, Santa Barbara</td>
</tr>
<tr>
<td>Ruth Curry</td>
<td>Senior Research Specialist,</td>
<td>Woods Hole Oceanographic Institution</td>
</tr>
<tr>
<td>Steven Giovannoni, PhD</td>
<td></td>
<td>Oregon State University</td>
</tr>
<tr>
<td>Michael W. Lomas, PhD</td>
<td></td>
<td>Bigelow Laboratory for Ocean Sciences</td>
</tr>
<tr>
<td>Norman B. Nelson, PhD</td>
<td></td>
<td>University of California, Santa Barbara</td>
</tr>
<tr>
<td>Philippe Rouja, PhD</td>
<td>Custodian of Historic Wrecks,</td>
<td>Bermuda Government</td>
</tr>
<tr>
<td>Samia Sarkis, PhD</td>
<td>Senior Marine Researcher, Department of Conservation Services</td>
<td></td>
</tr>
<tr>
<td>Struan R. Smith, PhD</td>
<td>Bermuda Natural History Museum</td>
<td>Virginia Institute of Marine Science</td>
</tr>
<tr>
<td>Deborah Steinberg, PhD</td>
<td></td>
<td>Bermuda Zoological Society</td>
</tr>
</tbody>
</table>

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**Bermuda Institute of Ocean Sciences**

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**BIOS**

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**pg 25  Bermuda Institute of Ocean Sciences**
Sim on J. Ussh er, PhD  
Plymouth Uni ver sity  
Scientific Technical Staff

EDUCATION

Kaitlin M. Baird  
Science in Educ at ion  
Coordinator

Penelope A.G. Barnes  
Education Director,  
University Programs

Chloe Baron  
Administrative Assistant,  
University Programs

John Paul Skinner  
Director of Ocean  
Academy

Heidi Smith  
University Programs/Library  
Assistant

Kyla Smith  
Program Assistant

Instructors
Penelope A.G. Barnes  
Nicholas R. Bates, PhD  
Maureen H. Conte, PhD  
Ruth Curry  
Samantha J. de Putron, PhD  
Gretchen E. Goodbody-Gringley, PhD  
University  
Eric J. Hochberg, PhD  
Andrew J. Peters, PhD

MARINE OPERATIONS

Ronald H. Harelstad  
Marine Superintend ent (Jan-Mar)

Quentin M. Lewis Jr.  
Marine Superintend ent (Apr-Dec)

Susan T. Brittner  
Marine Operations  
Coordinator

Rick J. Verlini  
Port Captain

Justin Smith  
Oceanographic Technical  
Services Manager

Jeremiah Brower  
Marine Technician (Jan - May)

Nick Mathews  
Marine Technician

Mason Schettig  
Marine Technician (Jul - Dec)

Orson Hyde (Relief)  
Howard Chen (Relief)  
Relief Marine Technicians
**R/V ATLANTIC EXPLORER**

**Captain**
George W. Gunther

**Relief Mates**
Courtney Barber III
Gary Ramos
Angelica Mendez
Larry Morris

**Relief Cooks**
R/V Atlantic Explorer Crew-
Bernhard Schulte Ship

**Chief Engineer**
John Crofts (Relief)

**Able Seaman**

**Bosun**
Randal Hughes (Relief)

**Chefs**

**1st Officer**
Teresa MacMartin (Relief)

**Motormen**
Richard E. Smith Jr.
Bob Cruise (Relief)
Joseph E. Howard (Relief)

**Seamen**
Bernardo Manalo
Lec Tindugan

**Relief Cooks**

**Staff and crew of the research vessel Atlantic Explorer. Photo by Tiffany Wardman**
Faculty & Staff

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LeeAnn Tuzo
*Accounts Payable Clerk*

William Graham-Welton
*Chief Financial and Operating Officer*

Ruth M. Heron-Watts
*Accountant*

Gillian M.S. Hollis
*Assistant to the President and CEO, and Secretary to the Corporation*

Alexander D. Hunter
*Dive Safety Officer/Small Boats Supervisor*

K. Mark Jolley
*Information Technology Manager*

Charles F. King
*Communications Technician*

Kelly McLaren
*Qualified Accountant*

Miranda J. Medeiros
*Human Resources Officer*

Charlene Millett
*Kitchen Assistant*

Victoria Millett
*CPA Treasurer and Controller*

Sharon Minors
*Office/Room Attendants*

Donika O’Mara
*Office/Room Attendants*

Simon J Parkinson
*Network and Systems Administrator*

Carol A. Pitcher
*Office/Room Attendants*

Vanessa Shorto
*Guest and Visitor Services Coordinator*

Helena Simoes
*Chef*

Antar Smith
*Network and Systems Administrator*

Jeremy Smith
*Painter/General Maintenance*

Sandy Spurling
*Projects Officer*

Georgianna White
*Laboratory Attendant*

Bruce Williams
*Laboratory Operations Technician*

Warren A. Smith

Electrician/Plumber

Kenneth E. Trott
*Truck/Bus Driver*

Gregory D. Wade
*General Maintenance*

Martin Wyer
*Human Resources Manager*

DEVELOPMENT, MARKETING & COMMUNICATIONS

Pamela Amaral
*Development Officer*

Carolyn Drake
*Development and Science Communications Officer*

Dr. Mark Guishard
*Director of Corporate and Community Relations*

Ali Hochberg
*Science Writer and Webmaster*

Amy Nevala
*Science Writer*

Audrey Rogerson
*Director of Resource Development*

Tiffany Wardman
*Marketing and Media Relations Manager*
Bermuda Institute of Ocean Sciences

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