

MRI (Track 1): Development of a modular Free Ocean Carbon Enrichment (FOCE) system for coastal research

Co-Principal Investigators:

Dr. Bradley J. Peterson

Associate Professor

SoMAS

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Dr. Serge Luryi

Distinguished Professor

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Dr. Christopher Gobler

Coastal Conservation Endowed Professor

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Dr. Nils Volkenborn

Assistant Professor

SoMAS

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Duration: 3 years

Estimated Costs: \$1,293,800 (NSF = \$966,639; Match = \$289,992)

Research Need/Justification for Development

The rapid proliferation in ocean acidification research has highlighted the need to develop experimental approaches that progress from: 1) single to multiple environmental drivers, 2) single species to communities and ecosystems, and 3) measures of acclimation to species' capacities for adaptation to future conditions. Addressing these challenges requires the development of new technologies and experimental approaches that can ***measure the response of species within intact assemblages or communities to multiple environmental changes, over fairly long time scales (months).***

Free Ocean Carbon Enrichment (FOCE) is defined as a technology facilitating studies of the consequences of ocean acidification for biogeochemical fluxes, marine organisms and communities by enabling the precise control of $p\text{CO}_2$ enrichment within *in situ*, partially open, experimental enclosures. FOCE experiments examine the effects of ocean acidification under more natural settings than laboratory conditions, typically consisting of a series of enclosures which are placed on the seabed over a habitat or community of interest. Modified elements (such as biological organisms) can also be added into the enclosure. The enclosure is semi-open, with surrounding ambient seawater flowing through it, which is manipulated to change the pH of the seawater, usually by the addition of CO_2 enriched seawater, which mixes with ambient seawater to

produce a desired pH offset. This offset is maintained for the duration of the experimental period and mirrors natural variations in surrounding pH.

The primary aim of this approach is to move from understanding single organism responses to ocean acidification, to the community and ecosystem level, through the use of in situ experimental approaches involving natural benthic communities.

FOCE systems are amenable to a spectrum of research questions, spanning a range of life history phases of planktonic and benthic taxa and processes important in shaping natural communities. FOCE systems can be used to address questions concerning the influence of ocean acidification on *colonization, physiological performance, growth, survival, succession, mediation of predation and competition, community metabolism, nutrient cycling, and other processes in benthic communities* (Gattuso et al. 2014). Laboratory studies, where the inherent complexity and variability of natural ecosystems is removed, are important in quantifying and describing mechanisms linked to ocean acidification that can be used to determine mathematical representations to be applied within models. Laboratory studies, however, do not provide information about the interplay between the various processes through which ocean acidification impacts a local community or ecosystem. Ecosystem-level studies of ocean acidification, therefore, remain largely absent. ***This is where the FOCE approach will provide real value: in the generation of the data required for the development of models that incorporate ecosystem-level understanding of the impacts of ocean acidification.*** The manipulation of environmental conditions within a whole community/habitat setting offered by FOCE will allow detection of potential changes in the flows of energy and matter between different community components, as well as potential interactions between various community components, or processes. Thus, the FOCE approach can provide a more holistic, contrasting, yet complementary approach to other ocean acidification research efforts (Riebesell & Gattuso, 2015).

The National Science Foundation (NSF), National Oceanographic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), National Park Service (NPS) and SEAGRANT have all released requests for proposals specifically targeting research on the impacts of ocean acidification in the last five years. Last November, Gov. Cuomo established the NY State Ocean Acidification Task Force. The development of a coastal FOCE would allow Stony Brook to propel SoMAS to the cutting edge of ocean acidification research and provide the only autonomous FOCE system on the east coast of the US.

Other FOCE systems

Currently, there are only two autonomous FOCE systems available in the United States. Dr. Bill Kirkwood (MBARI and Stanford Hopkins Marine Station) created the first FOCE designed to be operated at a depth of ~900 m to evaluate the effects of ocean acidification on the foraging behavior of deep-sea urchins (Figure 1). This was the first

proof of concept.



Figure 1. Deep Free Ocean Carbon Enrichment (dpFOCE) system constructed and deployed by MBARI between 2005 and 2011.

Dr. David Kline (Scripps Institute) created another FOCE system for use on the Great Barrier Reef in Australia to assess the impact of ocean acidification on the corals. It operated like the dpFOCE as a series of flumes (Figure 2).



Figure 2. Coral Prototype Free Ocean Carbon Enrichment (cpFOCE) system constructed and deployed in 2009 with the help of MBARI engineers and Dr. Bill Kline.

Instrument Description

What we propose is a significant modification of either of these designs for use in shallow water (<20 m) coastal environments. There is no instrument like this that exists in the US at this time. The criteria of the development of this system is:

1. The unit is powered autonomously (via wind and solar power) and can maintain treatments in the field for at least 12 weeks.

- The working schematic for the envisioned system is below (Figure 3).



Management Plan

The development of a coastal FOCE will require integrating existing sensors with new technologies. This can only be accomplished with the sensor and systems engineering expertise at Stony Brook's Center for Advanced Technologies (Sensor CAT).

Discussions with the center's director, Dr. Serge Luryi, envision a three year period of development and refinement. At the end of that time, the expectation is that the electronic expertise at the SoMAS Electronics Shop (eShop) will be sufficient to maintain the system. It is not the intention to establish a specialized technician pool to provide services to various investigators. With guidance, the cFOCE is intended for turnkey operations so utilization of the system is expected after a suitable training period of interested parties. Maintaining and deciding on scheduling and project priority will be directed by Dr. Bradley Peterson and a user committee, consisting initially of the co-PIs. Eventually, it is envisioned that the user committee will have members from across the spectrum of interested parties. After the system has been developed, a reasonable user fee schedule will be established for maintain and calibrate the sensors and pumps.

Budget Justification

The budget is broken into seven categories.

1. Personnel (\$247,422): These funds are for 2.5 months of faculty summer salary, 24 months of technician time and 36 months of graduate student funding to build the instrument.
2. Equipment (\$366,000): A significant portion of the funds are to purchase equipment for the development of the system. These include four SeapHOx sensors (\$35K each) to record and log the *in situ* treatment levels accomplished between the experimental and ambient experimental chambers. These sensors record pH on the Total Scale and thus provide the most accurate snapshot of the water column's chemical composition. In addition, four Controls HydroC (\$35K each) will measure $p\text{CO}_2$ in the water column, a flow meter (\$15K), four Satlantic logging Photosynthetically Active Radiation sensors (\$6,750 each), an ENVCO surface bouy (\$12K) to house the electronics, pumps, and mixing chambers and finally a two YSI EXO2 continuous logging sondes (\$32K).
3. Material and Supplies (\$60,000): These funds represent all of the materials needed to construct the system.
4. Engineering expertise (\$90,000): the Sensors and Systems division of the Center for Advanced Technologies will provide the engineering necessary to develop the FOCE system.
5. Travel (\$6,000): These funds are to bring the MBARI engineers, Dr. Bill Kirkwood (MBARI and Stanford Hopkins Marine Station) and Dr. David Kline (Scripps) to meet with sensor CAT engineers and the project PIs to assist in the design and provide

insight from the development of the two previously constructed FOCE systems in the US.

6. Tuition (\$15,210): These funds are for 36 months of tuition for the graduate student.

7. Boat time (\$12,000): These funds are for testing the instrument in the field in Yrs. 2 and 3.

Major Users of the developed technology at Stony Brook

SoMAS Faculty

Dr. Bassem Allam (Endowed Professor of Marinetics)

The impact of environmental factors (including ocean acidification) on immunity and infectious diseases has also been the focus of additional studies in other shellfish species such the American lobster and the eastern oyster. Research is also underway to evaluate the physiological mechanisms underlying the sensitivity or resistance of different species (or strains within the same species) to the continuously changing environment.

Dr. Josephine Aller (Professor)

One major area of long term research focuses on the geomicrobiology of animal-sediment interactions, the bacterial dominance of benthic biological communities and processes in tropical deltaic environments, the impact of physical disturbance on the structure and functioning of benthic communities in marine environments and the identification of biological indicators of those physical.

Dr. Robert Aller (Distinguished Professor)

The major areas of research interest include development and the use of planar optode sensors for in situ. Organic matter remineralization, suboxic reactions, and rates and kinetics of authigenic mineral dissolution-precipitation (particularly Fe-rich clays (reverse weathering reactions), carbonates, sulfur, biogenic silica) in tropical mobile mud facies and their impact on global biogeochemical cycles. Animal-sediment interactions, particularly biogeochemical, of macrobenthos living in soft-bottom regions of the sea floor and the effects of macrobenthic organisms on microbial metabolic activity and on the rate and distribution of biogenic and abiogenic reactions in the bioturbated zone of sediments.

Dr. Steven Beaupre (Assistant Professor)

My research interests seeks to constrain the ocean's role in Earth's climate system by examining the marine component of the global carbon cycle. Specifically, understanding the provenance and reactivity of organic carbon in the sea by coupling radiocarbon dating with chemical analyses.

Dr. Jackie Collier (Associate Professor)

The long-term goal of my research program is to improve our understanding of phytoplankton physiological ecology, population dynamics, community structure, and ecosystem roles by taking an autecological approach to investigating the lives of these microorganisms. The tools we use to answer these questions include observational and experimental (e.g., dilution gradient and nutrient addition) field studies, which are analyzed by techniques such as flow cytometry; lab-based investigations of phytoplankton physiology using various isolates growing in culture; and a variety of molecular biological, molecular genetics, and biochemical techniques.

Dr. Robert Cerrato (Associate Professor)

Populations of large suspension feeding bivalves such as the hard clam *Mercenaria mercenaria* have declined in the shallow, enclosed bays that are common features on Long Island. For a number of years, my research has tried to identify factors that contributed to the decline, and more recently it has focused on the loss of function created by the decline and its consequences.

Dr. Christopher Gobler (Professor, Endowed Chair of Coastal Ecology and Conservation)

A major research focus within our laboratory is understanding how climate change and coastal ocean acidification affects marine organisms and ecosystems. The combustion of fossil fuels has enriched levels of CO₂ in the world's oceans and decreased ocean pH. The degradation of anthropogenically-enriched organic matter in coastal ecosystems seasonally has a similar effect on ocean chemistry today, while concurrently depressing dissolved oxygen levels. The continuation of these processes can alter the growth, survival, and diversity of marine organisms. Within this realm, we have been engaged in studies investigating how future and current coastal ocean acidification effects the survival and performance of algae and larvae from bivalves and fish indigenous to North America. We further strive to understand how co-occurring stressors related to both climate change and shallow coastal ecosystems (hypoxia, thermal stress, algal blooms) may act and interact to effect the performance of marine animals.

Dr. Janet Nye (Assistant Professor)

Nye studies the effects of climate variability and climate change on fishes and marine ecosystems. She has documented large scale changes in fish distribution and assemblages in the Northwest Atlantic. As a quantitative ecologist she has developed models to incorporate the environment into fish population models and explored the combined impacts of climate and trophic interactions in ecosystem models. Recent work funded by NSF involves understanding the mechanistic responses of early life stage fishes to the combined effects of temperature, ocean acidification and hypoxia and incorporating these physiological responses into population and ecosystem models.

Dr. Bradley Peterson (Associate Professor)

My lab is focused on understanding the role of organisms in changing resource availability within their communities and how these interactions might affect community development and stability. I am interested in understanding how seagrass may mitigate the effects of ocean acidification in tropical and temperate marine communities with the end goal of optimizing experimental systems to modulate $p\text{CO}_2$ *in situ*. I would like to use this system to develop a comprehensive model to investigate trophic relationships in response to elevated $p\text{CO}_2$

Dr. Nils Volkenborn (Assistant Professor)

I am broadly interested in the functioning of the seafloor, specifically in the relation between key benthic species and sediment biogeochemistry. The largest part of our planet is covered by marine sediments and the uppermost layer is inhabited by diverse organisms that constantly rework and irrigate the sediment. By doing so these animals have a profound impact on the sediment properties, the biogeochemical rates and the exchange processes between the seafloor and the overlying water.

Dr. Qingzhi Zhu (Associate Professor)

My research focuses on the development of bio/chemical sensors for in-situ studying elemental cycling and biogeochemical reaction dynamics in the marine sediments. A major theme in my research is to understand the spatial and temporal distributions and dynamics of solutes and bioactive metals associated with the benthic infaunal community, and to conceptualize heterogeneous biogeochemical transport – reaction processes in bioturbated deposits. The tools and techniques to multi-dimensionally measure solutes and trace elements in natural sediment do not exist, so the development of new methodology is an important part of my research.

Ecology and Evolution faculty

Dr. Robert Thacker (Professor and Chair)

Our research focuses on taxonomy, systematics, and the evolution of ecological interactions. Recent projects have used sponges and their symbiotic microbial communities as model systems to study coevolution among hosts and symbionts, the evolution of community structure, and the evolution of mutualistic interactions.

Dr. Jeffery Levinton (Distinguished Professor)

Interested in the spatial relation of deposition of organic matter on the sea bed and cycling of organic matter and structural elements such as oyster reefs in relation to spatial patchiness in benthic population dynamics, especially in human-disturbed environments.

Dr. Dianna Padilla (Professor)

Phenotypic plasticity is the ability of an individual to alter its phenotype in response to the environment. I focus on inducible defenses, which are features of organisms that are phenotypically plastic and enhance competitive ability or the ability to find, capture or consume prey. My interests span all levels, from the functional morphology of traits, the ecological consequences of traits, and the evolutionary patterns of these traits among closely related species. Currently we are developing and testing models of the costs and benefits of inducible, reversible morphologies, and the consequences of linked responses, including behavior.

Major Users of the developed technology at other institutions

University of Connecticut at Avery Point

Dr. Hannes Baumann (Assistant Professor)

Our lab has been studying effects of acidification, hypoxia, and warming on the early and most vulnerable stages of coastal forage fishes such as the Atlantic silverside, *Menidia menidia*, the inland silverside, *M. beryllina*, or Northern sand lance *Ammodytes dubius*. We have built a state-of-the-art experimental setup that will allow rearing fish embryos, larvae, juveniles, and adults under factorial designs of static and fluctuating levels of CO₂, O₂, and temperature in order to identify vulnerabilities, mechanisms, and adaptive potential of coastal forage fish species. We are also in the process of developing monitoring capacities for pH and O₂ in nearshore habitats

NOAA Fisheries – Milford Lab

Dr. Shannon Meseck (Research Chemist)

I study the processes affecting the uptake and utilization of nitrogen and phosphate by algal cells; trophic transfers of stable isotopes (C and N) in bivalves as an indicator of habitat; biogeochemical effects of aquaculture; ocean acidification effects on marine organisms; and shellfish feeding behavior under different environmental parameters.

Dr. Matthew Poach (Research Chemist)

I characterize the carbonate parameters in coastal systems. Evaluating the effects of eutrophication and acidification on marine species and ecosystem processes. Evaluating the ecosystem services of shellfish and seaweed aquaculture.

Taylor Shellfish Farms

Bill Dewey (Director of Public Affairs)

Bill has worked with the west coast shellfish community to identify and prioritize research needs and secure research funding. In 2012 Washington's Governor Gregoire appointed him to the State's Ocean Acidification Blue Ribbon Panel.

East Coast Shellfish Growers Association

The Nature Conservancy

National Park Service

NOAA Coastal Reef Conservation Program

BIOGRAPHICAL SKETCH

Bassem Allam

Professor, School of Marine and Atmospheric Sciences (SoMAS)

Stony Brook University, Stony Brook, NY 11794-5000

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Email: Bassem.Allam@stonybrook.edu

<http://you.stonybrook.edu/madl/>

Professional preparation:

Lebanese University (Lebanon)	Natural Sciences/Biology	B.S., 1989
Lebanese University (Lebanon)	Natural Sciences/Biology	M.S., 1990
University of Western Brittany (France)	Biological Oceanography	M.S., 1993
University of Western Brittany (France)	Biological Oceanography	Ph.D., 1998
Rutgers University, IMCS, NJ	Molluscan Pathobiology	Post-doc, 1998-99
Marine Biological Laboratory, MA	Aquavet 2 (intensive course)	120 hrs course (2003)
Cold Spring Harbor Laboratory	Adv. Sequencing Technol. & Applications	120 hrs course (2013)

Professional Experience:

Professor, SoMAS, Stony Brook University, NY, 2014-present
Associate Professor, SoMAS, Stony Brook University, NY, 2009-2014
Assistant Professor, SoMAS, Stony Brook University, NY, 2003-2009
Courtesy Faculty, College of Veterinary Medicine, Cornell University, Ithaca, NY, 2005-present
Research and Teaching Associate, University of Antilles-Guyana (Guadeloupe), 2000-2001
Research and Teaching Associate, University of Angers (France), 1999-2000:
Post-doctoral Research Associate, Rutgers University, NJ, 1998-1999

Research Interests:

Pathology and immunology of marine invertebrates; Shellfish ecophysiology; Genomics

Synergistic Activities and Achievements:

Member, editorial boards of the journal *Diseases of Aquatic Organisms* and the *Journal of Invertebrate Pathology*
Adjunct Faculty, Department of Microbiology & Immunology, Cornell University (since 2005)
Guest instructor, University of Padova, Italy (2017) and the Marine Biological Laboratory (2016)
Fellow (Director of Research) of the Centre National de la Recherche Scientifique, Roscoff, France (Fall 2010) and the European Institute for Marine Studies, Brest, France (spring-summer 2011)
Research advisor and laboratory supervisor for undergraduate and high school students
Consulting services to the Long Island Association of Shellfish Managers and the New York State's Department of Environmental Conservation (Shellfish Bureau)

Recent Collaborators/Coauthors: Alistair Dove (The Georgia Aquarium, Atlanta), Anne McElroy (Stony Brook University -SBU), Antonius Koller (Columbia University), Arnaud Tanguy (University of Paris 6, France), Christine Paillard (CNRS, France), David Raftos (Macquarie University, Australia), Gregg Rivara (Cornell Cooperative Extension), Emmanuelle Pales Espinosa (SBU), Evan Ward (UConn), Gordon Taylor (SBU), Jackie Collier (SBU), Jeffrey Levinton (SBU), Mark Fast (University of Prince Edward Island, Canada), Roxanna Smolowitz (Roger Williams University), Sandra Shumway (UConn), Ximing Guo (Rutgers University)

Graduate and Postdoctoral Advisors:

Dr. Marcel Le Pennec, University of Western Brittany, Brest, France

Dr. Susan Ford (deceased), Rutgers University, NJ

Five Relevant Publications: ** indicate students*

- *Hornstein J, Pales Espinosa E, Cerrato R, Lwiza K, **Allam B.** (2018). The influence of temperature stress on the physiology of the Atlantic surfclam, *Spisula solidissima*. *Comparative Biochemistry and Physiology Part A* 222: 66-73.
- *Wang K, Pales Espinosa E, **Allam B.** (2016). Effect of “heat shock” treatments on QPX disease and stress response in the hard clam, *Mercenaria mercenaria*. *Journal of Invertebrate Pathology* 138: 39-49.
- *Perrigault M., *Dahl S.F., Pales-Espinosa E., **Allam B.** (2012). Effects of salinity on hard clam (*Mercenaria mercenaria*) defense parameters and QPX disease dynamics. *Journal of Invertebrate Pathology* 110(1): 73-82.
- *Dahl S, *Perrigault M, *Liu Q, Collier JL, Barnes DA, **Allam B.** (2011). Effects of temperature on hard clam (*Mercenaria mercenaria*) immunity and QPX (Quahog parasite unknown) disease development: I. Dynamics of QPX disease. *Journal of Invertebrate Pathology* 106: 314-321.
- *Perrigault M., *Dahl S.F., Pales Espinosa E., *Gambino L., **Allam B.** (2011). Effects of temperature on hard clam (*Mercenaria mercenaria*) immunity and QPX (Quahog parasite unknown) disease development: II. Defense parameters. *Journal of Invertebrate Pathology* 106: 322-332.

Other Recent Publications: ** indicate students*

- Pales Espinosa E, **Allam B.** (2018). Reverse genetics demonstrate the role of mucosal C-type lectins in food particle selection in the oyster *Crassostrea virginica*. *Journal of Experimental Biology*. Accessible at: <http://jeb.biologists.org/content/early/2018/02/07/jeb.174094>
- Bassim S, **Allam B.** (2018). SNP hot-spots in the clam parasite QPX. *BMC Genomics* 19: 486.
- *Lau Y-T, *Gambino L, *Santos B, Pales Espinosa E, **Allam B.** (2018). Regulation of oyster (*Crassostrea virginica*) hemocyte motility by the intracellular parasite *Perkinsus marinus*: A possible mechanism for host infection. *Fish and Shellfish Immunology* 78: 18-25.
- *Lau Y-T, *Gambino L, *Santos B, Pales Espinosa E, **Allam B.** (2018). Transepithelial migration of mucosal hemocytes in *Crassostrea virginica* and potential role in *Perkinsus marinus* pathogenesis. *Journal of Invertebrate Pathology* 153: 122-129.
- *Hartman R, Pales Espinosa E, **Allam B.** (2018). Identification of clam plasma proteins that bind its pathogen Quahog Parasite Unknown. *Fish and Shellfish Immunology* 77: 214-221.

Current and Pending Support

Investigator: Bassem Allam, Professor			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future Project/Proposal Title: Validation of markers and marker-assisted selection of hard clam for QPX resistance Source of Support: USDA Total Award Amount: \$326,608 Total Award Period Covered: 09/15/16-09/14/19 Location of Project: Stony Brook University Person-Months Per Year Committed to the Project: Cal: Acad: Sumr: 0.5			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future Project/Proposal Title: Genetic determinants of bivalve resilience to ocean acidification Source of Support: NOAA Total Award Amount: \$199,820 Total Award Period Covered: 08/01/16-05/31/19 Location of Project: Stony Brook University Person-Months Per Year Committed to the Project Cal: Acad: 1.0 Sumr: 0.5			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future Project/Proposal Title: Molecular mechanisms regulating food choice in bivalves Source of Support: NSF Total Award Amount: \$520,000 Total Award Period Covered: 05/01/17-04/30/20 Location of Project: Stony Brook University Person-Months Per Year Committed to the Project: Cal Acad: Sumr: 0.5			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future Project/Proposal Title: Integrating basic and applied science to protect and enhance marine resources in New York State Source of Support: New York State Total Award Amount: \$2,142,597 Total Award Period Covered: 04/01/17-03/31/22 Location of Project: Stony Brook University Person-Months Per Year Committed to the Project: Cal: Acad: 3 Sumr: 1			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future Project/Proposal Title: GHaNa: The Genus Haslea, New marine resources for blue technology and aquaculture Source of Support: European Commission Total Award Amount: \$1,297,000 (\$48,000) Total Award Period Covered: 01/01/17-12/31/21 Location of Project: Universite du Mans (France), University of Quebec, Stony Brook University Person-Months Per Year Committed to the Project: Cal: Acad: 0.5 Sumr:			

Current and Pending Support (Continued)

Investigator: Bassem Allam, Professor			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future			
Project/Proposal Title: Effect of current and projected climate conditions on the Atlantic Surfclam <i>Spisula solidissima</i>			
Source of Support: NYSG/NYSDEC			
Total Award Amount: \$199,978		Total Award Period Covered: 01/1/19-12/31/20	
Location of Project: Stony Brook University			
Person-Months Per Year Committed to the Project		Cal:	Acad: 0.75 Sumr: 0.5
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future			
Project/Proposal Title: Contrasting the performance of diploid and triploid oysters in the Northeast			
Source of Support: NOAA			
Total Award Amount: \$299,859		Total Award Period Covered: 12/1/19-11/30/21	
Location of Project: Stony Brook University			
Person-Months Per Year Committed to the Project		Cal:	Acad: Sumr: 0.2

Robert Curwood Aller

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(a) Professional Preparation:

University of Rochester, Rochester, NY B.S. Biology-Geology (with highest distinction), 1972

University of Rochester, Rochester, NY B.A. Chemistry (with highest distinction), 1972

Yale University, New Haven, CT M. Phil., Dept. of Geology and Geophysics, 1974

Yale University, New Haven, CT Ph.D., Dept. of Geology and Geophysics, 1977

Göteborg Universitet, Sweden, *Doctor Honoris Causa*, Faculty of Natural Science, 2002

Université de la Méditerranée (Aix-Marseille II), Marseille, France, *Doctor Honoris Causa*, 2005

(b) Appointments:

Distinguished Professor, School of Marine and Atmospheric Sciences (affiliated appointment in Dept. of Geosciences) SUNY Stony Brook (1998 - present).

Professor, Marine Sciences Research Center (joint appointment in Dept. of Geosciences), SUNY Stony Brook (1986-1998)

Research Associate (Professor), Geophysical Sciences, Univ. of Chicago, (1986-89)

Professor, Geophysical Sciences, University of Chicago, (1985-86)

Associate Professor (tenured), Geophysical Sciences, Univ. of Chicago, (1980-85)

Assistant Professor, Geophysical Sciences, Univ. of Chicago, (1977-80)

(c) Products:**Most closely related to the proposed project:**

Aller, R.C., 2014, Sedimentary diagenesis, depositional environments, and benthic fluxes. IN: H. Holland and K. K. Turekian (eds), *Treatise on Geochemistry*, 2nd edition, v. 8, 293 – 334, Oxford: Elsevier.

Cao, Z., Q. Zhu, R.C. Aller, J.Y. Aller, and S. Waugh, 2013, Seasonal, 2-D sedimentary extracellular enzyme activities and controlling processes in Great Peconic Bay, Long Island. *J. Mar. Res.*, 71, 399-423.

Green, M. and R. C. Aller, 2001, Early diagenesis of calcium carbonate in Long Island Sound sediments: Measurements of Ca^{2+} and minor element fluxes during seasonal periods of net dissolution. *J. Mar. Res.* 59, 769-794.

Green, M. A., R. C. Aller, and J. Y. Aller, 1993, Carbonate dissolution and temporal abundances of Foraminifera in Long Island Sound sediments. *Limnol. Oceanogr.*, 38 331-345

Aller, R. C., 2001, Solute transport and biogeochemical reactions in the bioirrigated zone. In: The benthic boundary layer: Transport processes and biogeochemistry. (B. Boudreau and B. B. Jørgensen, eds.). Oxford Press, 269 - 301.

Other significant products:

Blair, N.E. and R.C. Aller, 2012, The fate of terrestrial organic carbon in the marine environment. *Ann. Rev. Mar. Sci.* 4, 401-423.

Zhu, Q., R. C. Aller, and Y. Fan, 2006, Two-dimensional pH distributions and dynamics in bioturbated marine sediments. *Geochim. Cosmochim. Acta* . 70, 4933-4949.

- Green, M. A., R. C. Aller, and J. Y. Aller, 1998, The influence of carbonate dissolution on the survival of shell-bearing meiobenthos in nearshore sediments *Limnol. Oceanogr.* 43, 18-28.
- Rude, P.D. and R.C. Aller, 1991. Fluorine mobility during the early diagenesis of carbonate sediment. *Geochim. Cosmochim. Acta.* 55, 2491-2509.
- Aller, R.C. 1982. Carbonate dissolution in shallow water marine sediments: role of physical and biological reworking. *J. Geol.* 90:79-95.

(d) Synergistic and Educational Activities

1. *Innovations in teaching and training*: core curriculum design and implementation, School of Marine and Atmospheric Sciences (2012).
2. *Facilitating research opportunities for a diverse undergraduate student population*: High School student research advisor, NSF REU program mentor, National and Regional Ocean Sciences Bowl Judge
3. *Service to the scientific community*:
Associate Editor *Journal of Marine Research* (2012 -), Associate Editor *Geochim. Cosmochimica Acta* (85-93; 2006 - 2012), Assoc. Editor, *Geobiology* Editorial Board (05-present), Assoc. Editor *Ichnos* (1991-2001, paleontology), Editorial Board *Continental Shelf Research* (82 - 06)
4. *Reviewer for multiple journals, major program advisory panels, NSF review panels* (Member, AC NSF ad hoc subcommittee, Future of Ocean Drilling (2011))
5. *Service to Community*: General public/community general science lectures; Science Bowl judge

CURRENT AND PENDING SUPPORT

Robert Aller

Current:

Title: Coupling of carbonate cycling and redox reactions in the bioturbated zone of marine sediments

Source of support: NSF OCE - Program

Role: PI

Duration: 07/01/17-6/30/20

Total award request: \$863,043

Person-months per year committed to the project: 1 summer

Location of Project: Stony Brook University

Title: Iron cycling in bioturbated sediments - Fluxes, diagenetic redistribution, and isotopic signatures

Source of support: NSF OCE – Chemical Oceanography Program

Role: co-PI (Laura Wehrmann, PI; Nils Volkenborn, co-PI)

Duration: 4/18 – 3/21

Total award request: \$574,842

Person-months per year committed to the project: .25 summer

Location of Project: Stony Brook University

Josephine Y. Aller

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State University of New York
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(a) Professional Preparation:

University of California at Berkeley, Berkeley, CA B.S. Zoology with Honors, 1969
University of South California, Los Angeles, CA Ph. D. Marine Science, 1975
Yale University, New Haven, CT Postdoctoral Fellow, Department of Geology and
Geophysics, 1975-1979

(b) Appointments:

Professor, 2009- School of Marine and Atmospheric Sciences, Stony Brook University
Research Professor, School of Marine and Atmospheric Sciences, Stony Brook University 2004-
2009
Associate Research Professor, Marine Sciences Research Center, Stony Brook University, 1985-
2004
Research Scientist, Department of Biological Sciences, Wayne State Univ., 1979-1985
Fulbright Senior Scholar, Australian Institute of Marine Science, Townsville, AU 2000

(c) Products:**Most closely related to the proposed project:**

- Aller, J. Y., J. C. Radway, W. P. Kalthau, D. W. Bothe, T. W. Wilson, R. D. Vaillancourt, P. K. Quinn, D. J. Coffman, B. J. Murray, and D. A. Knopf. 2017. Size-resolved characterization of the polysaccharidic and proteinaceous components of Sea Spray Aerosol. *Atmospheric Environment* 154:331-347. doi.org/10.1016/j.atmosenv.2017.01.053 1352-2310
- Ladino, L.A., J.D. Yakobi-Hancock, D.A. Knopf, J.Y. Aller, W.P. Kalthau, R.H. Mason, M. Si, L.A. Miller, J. Li, A. Huffman, W.R. Leitch, C.L. Schiller, A.K. Bertram, and J.P.D. Abbatt. 2016. Addressing the ice nucleating abilities of marine aerosol: A combination of deposition mode laboratory and field measurements. *Atmospheric Environment* 132: 1-10.
- Wilson, T. W., L. A. Ladino, P. Alpert, M. Breckels, I. M. Brooks, J. Browse, S.M. Burrows, K.S. Carslaw, J. A. Huffman, C. Judd, W.P. Kalthau, R. Mason, G. McFiggans, L. A. Miller, J. Najera, E. Polishchuck, S. Rae, C.L. Schiller, M. Si, T.F. Whale, J. Vergara Temprado, J. Wong, O. Wurl, J. D. Yakobi-Hancock, J.P.D. Abbatt, J. Y. Aller, A. K. Bertram, D. A. Knopf, and B. J. Murray. 2015. A marine biogenic source of atmospheric ice nucleating particles. 2015. *Nature* 525: 234-248
- Alpert, P. A., W. P. Kalthau, D. W. Bothe, JoAnn C. Radway, J. Y., Aller and D. A. Knopf. 2015. The Influence of Marine Microbial Activities on Aerosol Production: A Laboratory Mesocosm Study. *Journal of Geophysical Research: Atmospheres*. 120, doi:10.1002/2015JD023469
- Alpert, P. A., Aller, J. Y., and Knopf, D. A. 2011. Initiation of the Ice Phase by Marine Biogenic Surfaces in Supersaturated Gas and Supercooled Aqueous Phases'. Special issue "Physics and chemistry of water and ice" *Physical Chemistry Chemical Physics* 13(44), 19882-19894

Other significant products:

- Knopf, D. A., P. A. Alpert, B. Wang, J. Y. Aller. 2011. Stimulation of ice nucleation by marine diatoms. *Nature Geoscience* 4:88-90
- Alpert, P. A., Aller, J. Y., and Knopf, D. A. 2011. Ice nucleation from aqueous NaCl droplets with and without marine diatoms. *Atmospheric Chemical Physics* 11: 5539-5555: 10.5194/acpd-11-1-2011

- Aller, J.Y., M.M. Kuznetsova, C.J. Jahns, P.F. Kemp. 2005. Enrichment of viruses and bacteria in the sea surface microlayer and marine aerosols. *Journal of Aerosol Science* 36(5/6): 801-812.
- Kuznetsova M., C. Lee, and J. Aller. 2005. Characterization of the proteinaceous matter in marine aerosols. *Marine Chemistry* 96: 359-377.
- Kuznetsova M., Lee, C. Aller J., and N. Frew. 2004. Amino acid dynamics along a coastal to open ocean productivity transect. *Limnology & Oceanography* 49(5): 1605-1619.

(d) Synergistic Activities

1. *Innovations in teaching and training*: REU SoMAS site program Coordinator 1999- 2012 (REU in Oceanographic and Atmospheric Processes); Research mentor and laboratory supervisor for Stony Brook undergraduates through the Undergraduate Research and Creative Activities (URECA) program and high school students through the Simon's Foundation Summer high school research series; Research advisor for multiple Intel Science Talent Search participants; Mentor for undergraduate students in environmental research.
2. *Facilitating research opportunities for a diverse high school and undergraduate student population*: Advisor for AGEF (Alliance for Graduate Education and the Professoriate), Mentor for AGEF sponsored Summer Research programs; ODEG GeoPREP Track for underrepresented high school students, and W. Burghardt Turner Graduate Fellowship Program for underrepresented graduate students. Designer of research activities for minority students and participant in the WISE program to enhance exposure of female students to the field of ocean/atmosphere interactions; National Ocean Sciences Bowl Judge at regional competition site.
3. *Service to the scientific community*:
Co-editor of symposium volume on Organism-Sediment Interactions, USC Press (2001), Co-chair of several special sessions at ASLO/AGU national meetings (2001-present).
4. *Reviewer for multiple journals and program panel participant*; Reviewer of proposals for NSF, SERDP/DOD, NOAA; DOE; NSF panel member (i.e. Ecosystem Science Cluster, Research Experience for Undergraduates, Chemical Oceanography)
5. *Service to Community*: General public/community general science lectures. Judge for regional science fairs, National Ocean Sciences Bowl (NOSB) annual New York competition judge

CURRENT AND PENDING SUPPORT

Josephine Aller

Current:

Title: Coupling of carbonate cycling and redox reactions in the bioturbated zone of marine sediments

Source of support: NSF OCE - Program

Role: Co-PI with Q.Z. Zhu; PI: R.C. Aller

Duration: 07/01/17-6/30/20

Total award request: \$863,043

Person-months per year committed to the project: 1

Location of Project: Peconic Bays, Stony Brook University

Title: Characterization of seawater under future ocean conditions and chemical aging of sea spray aerosol.

User Award: ALS-08113

Source of support: DOE Advanced Light Source: Lawrence Berkeley National Laboratory

Role: Experimenter and PI: Josephine Y. Aller, Co-PI: Daniel A. Knopf

Duration: 2016-2018

Person-months per year committed to the project: 0

Location of Project: Berkeley, CA

Title: Characterization of sea spray aerosol under future ocean conditions with implications for cloud formation processes. User Award: EMSL/PNNL ID: 49402

Source of support: DOE Environmental Molecular Sciences Laboratory/ Pacific Northwest National Laboratory

Role: PI: Josephine Aller, Co-PI: Daniel A. Knopf

Duration: 2017-2018

Person-months per year committed to the project: 0

Location: Richmond, WA

Pending:

Title: Rhizosphere mediated initiation and development of a mangrove ecosystem, from fluidized muds to structured forest.

Source of support: NSF DEB Ecosystem Science Cluster:

Role: Co-PI with Q.Z. Zhu; PI: R.C. Aller

Duration: 05/01/19-04/30/22

Total award request: \$07,807

Person-months per year committed to the project: 1 summer

Location of Project: French Guiana, Stony Brook University

Title: INFEWS/T2: Lake Victoria Food, Energy and Water Systems (LakeVIEW) -balancing the food production and energy demands with preservation of water resources, under climate change.

Source of support: NSF DEB Ecosystem Science Cluster:

Role: Co-PI with G. He, S.-G. Jang, and M. Xia; PI: Kamazima Lwiza

Duration: 07/01/19-6/30/22

Total award request: \$2,424,329

Person-months per year committed to the project: 1 summer

Location of Project: Lake Victoria, East Africa, Stony Brook University

Title: Characterization of sea spray aerosol under future ocean conditions with implications for ice nucleating particles

Source of Support: AGS-GEO/ATM Atmospheric Chemistry

Role: PI with Co-PI: Daniel Knopf

Duration 2019-2022

Total award request: \$715,395

Person-months per year committed to the project: 1 summer

Location of Project: Stony Brook University, Pacific Northwest National Laboratories, Lawrence Berkeley National Laboratory.

Steven Robert Beaupré

Curriculum Vitae, November 2018

Stony Brook University • School of Marine and Atmospheric Sciences • Stony Brook, NY 11794-5000
phone: 631-632-3748 • **fax:** 631-632-8820 • **email:** steven.beaupre@stonybrook.edu

EDUCATION

- 2007 Ph.D. **University of California, Irvine:** Earth System Science
Dissolved organic carbon concentrations and isotope ratios in the northeast Pacific Ocean
- 2003 M.S. **University of California, Irvine:** Earth System Science
Carbon isotope ratios in the study of marine DOC photochemical degradation
- 1999 B.S. **State University of New York, Environmental Science & Forestry (ESF):** Chemistry
Senior Thesis: Ultraviolet absorbance and photobleaching of CDOM in seawater

RESEARCH INTERESTS

Biogeochemistry & the marine carbon cycle, including dissolved and particulate organic matter (DOM, POM), Primary Marine Aerosol (PMA), dissolved inorganic carbon (DIC), and marine sediments

Photochemical, thermal, acid/base, and microbiological transformations of natural organic mixtures

Coupled kinetic / isotopic (^{13}C , ^{14}C) reaction analyses to rapidly characterize coarse chemical, isotopic, and reactivity spectra of complex natural mixtures

Method development and optimization for novel geochemical observations at the highest precisions

PROFESSIONAL EXPERIENCE

- 2015 – **Assistant Professor:** Stony Brook University
School of Marine & Atmospheric Sciences
- 2015 – 2017 **Associate** (visiting scientist): Harvard University
Earth & Planetary Sciences Dept.
- 2013 – 2014 **Research Associate:** Harvard University
Earth & Planetary Sciences Dept., *supervisor: A. Pearson*
- 2012 – 2014 **Visiting Investigator:** Woods Hole Oceanographic Institution
Geology & Geophysics / NOSAMS, *supervisor: W. Jenkins*
- 2010 – 2012 **Postdoctoral Investigator:** Woods Hole Oceanographic Institution
Geology & Geophysics / NOSAMS, advisors: *W. Jenkins, M. Roberts*
- 2007 – 2009 **Postdoctoral Scholar:** University of California, Irvine
Earth System Science Dept., advisors: *E.R.M. Druffel, J. Southon, X. Xu*
- 2000 – 2007 **Graduate Research Assistant:** University of California, Irvine
Earth System Science Dept., advisor: *E.R.M. Druffel*
- 2002 **Research Assistant:** University of California, Irvine
Earth System Science Dept., supervisors: *S. Trumbore, M. Goulden*
- 2000 **Intern:** Bristol-Myers Squibb Co., Syracuse, NY
Chemical Development Dept., supervisor: *D. Weaver*

- 1998 – 2000 **Undergraduate Research Assistant:** SUNY Environmental Science & Forestry
Chemistry Dept., advisor: *D.J. Kieber*
- 1998 **NSF Research Experiences for Undergrads (REU) Fellow:** Clarkson University
Chemistry Dept., supervisor: *B. Levine*
- 1996 – 1997 **Undergraduate Research Assistant:** Syracuse University
Physics Dept., supervisors: *R. Mountain, S. Stone*

PROFESSIONAL AFFILIATIONS

American Chemical Society (ACS)
 American Geophysical Union (AGU)
 Association for the Science of Limnology and Oceanography (ASLO)
 The Geochemical Society (GS)
 The Oceanography Society (TOS)
 American Scientific Glassblower's Society (ASGS)

PUBLICATIONS (peer-reviewed)

1. Lu, X., and **S. R. Beaupré** (*Submitted*). Optimized volume determinations and uncertainties for accurate and precise manometry. *Submitted to Radiocarbon*.
2. **Beaupré, S. R.** (*Accepted*). Radiocarbon-Based Insights into the Biogeochemical Cycles of Marine Dissolved and Particulate Organic Carbon. *Encyclopedia of Ocean Sciences*, 3rd Edition.
3. Taylor, G. T., Suter, E. A., Li, Z. Q., Chow, S., Stinton, D., Zaliznyak, T., and **Beaupré S. R.** (2017). Single-Cell Growth Rates in Photoautotrophic Populations Measured by Stable Isotope Probing and Resonance Raman Microspectrometry. *Front Microbiol* **8**. <http://doi.org/10.3389/fmicb.2017.01449>
4. Mahmoudi, N., **Beaupré, S. R.**, Steen, A. D., & Pearson, A. (2017). Sequential bioavailability of sedimentary organic matter to heterotrophic bacteria. *Environmental Microbiology*. <http://doi.org/10.1111/1462-2920.13745>
5. Walker, B. D., **Beaupré, S. R.**, Guilderson, T. P., McCarthy, M. D., & Druffel, E. R. M. (2016). Pacific carbon cycling constrained by organic matter size, age and composition relationships. *Nature Geoscience*. 9(12), 888-891. <http://doi.org/10.1038/ngeo2830>
6. Walker, B. D., Primeau, F. W., **Beaupré, S. R.**, Guilderson, T. P., Druffel, E. R. M., & McCarthy, M. D. (2016). Linked changes in marine dissolved organic carbon molecular size and radiocarbon age. *Geophysical Research Letters*. 43(19), 10385-10393. <http://doi.org/10.1002/2016GL070359>
7. **Beaupré, S. R.**, Mahmoudi, N., & Pearson, A. (2016). IsoCaRB: A novel bioreactor system to characterize the lability and natural carbon isotopic (¹⁴C, ¹³C) signatures of microbially respired organic matter. *Limnology and Oceanography: Methods*, 14(10), 668-681. <http://doi.org/10.1002/lom3.10121>
8. Trumbore, S. E., Xu, X., Santos, G. M., Czimczik, C. I., **Beaupré, S. R.**, Pack, M. A., et al. (2016). Preparation for Radiocarbon Analysis. In E. A. G. Schuur, E. Druffel, & S. E. Trumbore (Eds.), *Radiocarbon and Climate Change* (1st ed., pp. 279–315). Springer International Publishing. http://doi.org/10.1007/978-3-319-25643-6_9

9. Druffel, E. R. M., **Beaupré, S. R.**, & Ziolkowski, L. A. (2016). Radiocarbon in the Oceans. In E. A. G. Schuur, E. R. M. Druffel, & S. E. Trumbore (Eds.), *Radiocarbon and Climate Change* (1st ed., pp. 139–166). Springer International Publishing. http://doi.org/10.1007/978-3-319-25643-6_5
10. Soulet, G., Skinner, L. C., **Beaupré, S. R.**, & Galy, V. (2016). A Note on Reporting of Reservoir ^{14}C Disequilibria and Age Offsets. *Radiocarbon*, 58(1), 205–211. <http://doi.org/10.1017/RDC.2015.22>
11. **Beaupré, S. R.** (2015). Chemical oceanography: The ocean's pressure cooker. *Nature Geoscience*, 8, 820–821. <http://doi.org/10.1038/ngeo2562>
12. **Beaupré, S. R.**, M. L. Roberts, J. R. Burton, and R. E. Summons (2015), Rapid, high-resolution ^{14}C chronology of ooids, *Geochimica et Cosmochimica Acta*, 159, 126–138. <http://doi.org/10.1016/j.gca.2015.03.009>
13. **Beaupré, S. R.** (2015). The isotopic composition of marine DOC. In D. A. Hansell & C. A. Carlson (Eds.), *Biogeochemistry of Marine Dissolved Organic Matter* (2nd ed., pp. 335–368). San Diego, CA: Academic Press. <https://doi.org/10.1016/B978-0-12-405940-5.00006-6>
14. Plante, A. F., **Beaupré, S. R.**, Roberts, M. L., & Baisden, T. (2013). Distribution of radiocarbon ages in soil organic matter by thermal fractionation. *Radiocarbon*, 55(2–3), 1077–1083. http://doi.org/10.2458/azu_js_rc.55.16310
15. Roberts, M., **Beaupré, S. R.**, & Burton, J. R. (2013). A high-throughput, low-cost method for analysis of carbonate samples for ^{14}C . *Radiocarbon*, 55(2–3), 585–592. <http://doi.org/10.1017/S0033822200057726>
16. Roberts, M. L., Reden, von, K. F., Burton, J. R., McIntyre, C. P., & **Beaupré, S. R.** (2013). A gas-accepting ion source for Accelerator Mass Spectrometry: Progress and applications. *Nuclear Instruments & Methods in Physics Research, Section B - Beam Interactions with Materials and Atoms*, 294, 296–299. <http://doi.org/10.1016/j.nimb.2011.10.016>
17. Longworth, B. E., Robinson, L. F., Roberts, M. L., **Beaupré, S. R.**, Burke, A., & Jenkins, W. J. (2013). Carbonate as sputter target material for rapid ^{14}C AMS. *Nuclear Instruments & Methods in Physics Research, Section B - Beam Interactions with Materials and Atoms*, 294(0), 328–334. <http://doi.org/10.1016/j.nimb.2012.05.014>
18. **Beaupré, S. R.**, & Druffel, E. R. M. (2012). Photochemical reactivity of ancient marine dissolved organic carbon. *Geophysical Research Letters*, 39(L18602), 1–5. <http://doi.org/10.1029/2012GL052974>
19. von Reden, K. F., Roberts, M. L., Burton, J. R., & **Beaupré, S. R.** (2012). Optimizing a microwave gas ion source for continuous-flow accelerator mass spectrometry. *Review of Scientific Instruments*, 83(2), 02B304. <http://doi.org/10.1063/1.3656408>
20. **Beaupré, S. R.** (2012), Low-friction glass-encased magnetic stir bars, *Fusion, Journal of the American Scientific Glassblowers Society*, 51(3), 31–35.
21. McCarthy, M., **Beaupré, S. R.**, Walker, B. D., Voparil, I., Guilderson, T. P., & Druffel, E. R. M. (2011). Chemosynthetic origin of ^{14}C -depleted dissolved organic matter in a ridge-flank hydrothermal system. *Nature Geoscience*, 4, 32–36. <http://doi.org/10.1038/ngeo1015>
22. Walker, B. D., **Beaupré, S. R.**, & Guilderson, T. P. (2011). Large-volume ultrafiltration for the study of radiocarbon signatures and size vs. age relationships in marine dissolved organic matter. *Geochimica et Cosmochimica Acta*, 75(18), 5187–5202. <http://doi.org/10.1016/j.gca.2011.06.015>
23. **Beaupré, S. R.**, & Aluwihare, L. (2010). Constraining the 2-component model of marine dissolved organic radiocarbon. *Deep-Sea Research II*, 57(16), 1494–1503. <http://doi.org/10.1016/j.dsr2.2010.02.017>

24. Burd, A. B., D. A. Hansell, D. K. Steinberg, T. R. Anderson, J. Aristegui, F. Baltar, **S. R. Beupré**, K. O. Beusseler, F. DeHairs, G. A. Jackson, D. Kadko, R. Koppelman, R. S. Lampitt, T. Nagata, T. Reinthaler, C. Robinson, B. Robison, C. Tamburini, and T. Tanaka (2010). Assessing the apparent imbalance between geochemical and biochemical indicators of meso- and bathypelagic biological activity: What the @\$#! is wrong with present calculations of carbon budgets? *Deep-Sea Research II*, 57(16), 1557–1571. <http://doi.org/10.1016/j.dsr2.2010.02.022>
25. Druffel, E. R. M., **Beupré, S. R.**, Griffin, S., & Hwang, J. (2010). Variability of dissolved inorganic radiocarbon at a surface site in the northeast Pacific Ocean. *Radiocarbon*, 52(2-3), 1150–1165. <https://doi.org/10.1017/S0033822200046221>
26. Griffin, S., **Beupré, S. R.**, & Druffel, E. R. M. (2010). An alternate method of diluting dissolved organic carbon seawater samples for ¹⁴C analysis. *Radiocarbon*, 52(2-3), 1224–1229. http://doi.org/10.2458/azu_js_rc.52.3620
27. **Beupré, S. R.**, & Druffel, E. R. M. (2009). Constraining the propagation of bomb-radiocarbon through the dissolved organic carbon (DOC) pool in the northeast Pacific Ocean. *Deep Sea Research Part I: Oceanographic Research Papers*, 56(10), 1717–1726. <http://doi.org/10.1016/j.dsr.2009.05.008>
28. Druffel, E. R. M., Bauer, J. E., Griffin, S., **Beupré, S. R.**, & Hwang, J. (2008). Dissolved inorganic radiocarbon in the North Pacific Ocean and Sargasso Sea. *Deep-Sea Research I*, 55(4), 451–459. <http://doi.org/10.1016/j.dsr.2007.12.007>
29. **Beupré, S. R.**, Druffel, E. R. M., & Griffin, S. (2007). A low-blank photochemical extraction system for concentration and isotopic analyses of marine dissolved organic carbon. *Limnology and Oceanography: Methods*, 5(6), 174–184. <http://doi.org/10.4319/lom.2007.5.174>
30. Druffel, E. R. M., Griffin, S., **Beupré, S. R.**, & Dunbar, R. B. (2007). Oceanic climate and circulation changes during the past four centuries from radiocarbon in corals. *Geophysical Research Letters*, 34(L09601), 1–4. <http://doi.org/10.1029/2006GL028681>
31. Santos, G. M., Southon, J. R., Griffin, S., **Beupré, S. R.**, & Druffel, E. R. M. (2007). Ultra small-mass AMS ¹⁴C sample preparation and analyses at KCCAMS/UCI Facility. *Nuclear Instruments & Methods in Physics Research, Section B - Beam Interactions with Materials and Atoms*, 259(1), 293–302. <http://doi.org/10.1016/j.nimb.2007.01.172>
32. Druffel, E. R. M., Griffin, S., Hwang, J., Komada, T., **Beupré, S. R.**, Druffel-Rodriguez, K. C., et al. (2007). Variability of monthly radiocarbon during the 1760s in corals from the galapagos islands. *Radiocarbon*, 46(2), 627–631–631. <http://doi.org/10.1017/S0033822200035670>

AWARDS

- 2018 – Minghua Zhang Early Career Faculty Development Grant,
“Quantifying the photochemical reactivity of refractory marine dissolved organic matter: a novel methodological approach”. Steven R. Beupré (PI)
- 2015 – 2018 NSF Chemical Oceanography,
“Collaborative Research: Coupled Ocean-Atmosphere Recycling of Refractory Dissolved Organic Carbon in Seawater.” David J. Kieber (PI), William C. Keene (Co-PI), Steven R. Beupré (Co-PI), Michael S. Long (Co-PI)

FELLOWSHIPS

- 2000 – 2006 Chancellor’s Club Fund for Excellence Dissertation Fellowship, UC Irvine

La Verne Noyes Fellowship, UC Irvine
 NSF Graduate Research Fellowship, UC Irvine
 Alumni Association Tamura Fellowship, UC Irvine
 California Space Grant (NASA), UC Irvine
 1995 - 1999 Ernest Sondheimer Memorial Award, SUNY ESF
 Alumni Association Memorial Scholarship, SUNY ESF
 Merck Award for Environmental Biochemistry, SUNY ESF
 John Meyer Junior Chemistry Award, SUNY ESF
 CRC Press Freshman Chemistry Award, SUNY ESF
 Syracuse Pulp & Paper Foundation (SPPF) Scholarship, SUNY ESF

OTHER ACADEMIC HONORS

2000 – 2008 Best Graduate Student Research Paper Award, Earth System Science Dept., UC Irvine
 Dissertations Symposium on Chemical Oceanography (DISCO) XX, Honolulu, HI
 Outstanding Student Paper Award, 2006 AGU Ocean Sciences Meeting, Honolulu, HI
 Outstanding Contributions to the Dept. of Earth System Science Award, UC Irvine
 1998 – 2000 SUNY Chancellor's Award, State University of New York
 Maple Leaf Award for significant volunteer service, SUNY ESF
 Robin Hood Oak Award for outstanding contributions to SUNY ESF
 Antarctica Service Medal, United States of America

FIELD EXPERIENCE

Marine (~133 days at sea)

Sep 2016 Primary marine aerosol provenance, photoreactivity, & ^{14}C ages, N. Atlantic (*R/V Endeavor*)
 Oct 2010 WHOI Trustees outreach & demonstration cruise, Buzzards Bay, MA (*R/V Tioga*)
 Sep 2010 DOC/POC/Sediment provenance along the North Atlantic slope of the U.S. (*R/V Atlantis*)
 Oct 2004 DOC ^{14}C age/photochemical reactivity at Station M in the N. Pacific (*R/V New Horizon*)
 Jun 2002 DOC/POC/DIC ^{14}C temporal variability at Station M in the N. Pacific (*R/V New Horizon*)
 Jul 1999 DOM UV-Vis photo-bleaching and photo-degradation in the Gulf of Maine (*R/V Endeavor*)
 Oct 1998 Photochemical production of $\text{NO}_3^-/\text{NO}_2^-$ /small carbonyls in the S. Ocean (*ARSV L.M. Gould*)

Terrestrial

Jun 2002 Soil/root respiration source apportionment via ^{14}C and eddy-covariance in Manitoba, CN

TEACHING EXPERIENCE

Instructor of record

2017 – 2018	Chemical Oceanography (Mar 503, grad), Stony Brook University
2016	Isotope Geochemistry (Mar 529, grad), Stony Brook University
2015 – 2018	Introduction to Ocean Chemistry (Mar 351, undergrad), Stony Brook University
2012 – 2013	General Chemistry I with Lab (Chem 151, undergrad), Massasoit Community College
2010	The Atmosphere (ESS 5, undergrad), UC Irvine
2010	Honors Oceanography (MS 100H, undergrad), Orange Coast College
2009 – 2010	Marine Science Laboratory (MS 100L, undergrad), Orange Coast College
2008	Introduction to Earth System Science (ESS 1, undergrad), UC Irvine

Teaching assistant

2002	Introduction to Oceanography (ESS 2, undergrad), UC Irvine
2001	Introduction to Earth System Science (ESS 10, undergrad), UC Irvine
1998	Computing Methods (APM 153, undergrad), SUNY ESF

Tutor

1997 – 2000	Organic Chemistry / General Chemistry, SUNY ESF
-------------	---

Graduate students supervised at Stony Brook University

Xi Lu	Stony Brook PhD advisor, 2016 – present
Brooke Morrell	Stony Brook M.Sc. committee member, 2018 – present
Evan Horowitz	Stony Brook M.Sc. committee member, 2018 – present
Kristen Butler	Stony Brook M.Sc. committee member, 2015 – 2017

Research supervision and mentoring of junior scientists at other universities

Postdocs:

Nagissa Mahmoudi (2014 – 2018, Harvard University), now faculty at McGill University
Brett Walker (2012 – 2018, UC Irvine), now faculty at University of Ottawa
Prosper Zigah (2015 – 2017, WHOI), now Postdoc at University of Pittsburgh

Grad students:

Alysha Coppola (2012 –), now Postdoc at ETH, Zurich
Kalina Gospodinova (2010 – 2014). Now Research Associate at NOSAMS, WHOI

Outreach

- 2016 **Science Judge:** National Ocean Sciences Bowl: Bay Scallop Bowl, Mt. Sinai, NY
- 2011 **Guest Speaker:** SUNY ESF Alumni Association, Woods Hole, MA
- 2011 **Guest Speaker:** Science Transfer Seminar, Massasoit Community College, MA
- 2010 **Blogger:** from R/V Atlantis during AT16-1, <http://thedailybucketonline.blogspot.com>
- 2009 **Laboratory host:** Community Science Night, Orange Coast College, CA
- 2008 **Guest Speaker:** Faculty Outreach Collaborations Uniting Scientists, Students, & Schools (FOCUS), UC Irvine
- 2008 **Guest Speaker:** California Alliance for Minority Participation (CAMP), UC Irvine
- 2006 – 2007 **Guest Scientist:** Ask-a-Scientist events. K-12, Orange County School District, CA
- 2000 – 2007 **Guest Speaker:** math and science for K-12 classes, Fulton, NY
- 1997 – 2000 **Event organizer & judge:** Regional Science Olympiad, Syracuse, NY

PROFESSIONAL SERVICE

Journal referee

Analytical Chemistry
Atmosphere
Ecosystems
Geobiology
Geochimica et Cosmochimica Acta (GCA)
Geophysical Research Letters (GRL)
Global Biogeochemical Cycles (GBC)
Journal of Geochemical Research-Biogeosciences (JGR-BGS)
Limnology and Oceanography: Methods
Marine Chemistry
Nature Geoscience
Proceedings of the National Academies of Science (PNAS)
Radiocarbon

Proposal referee

NSF: Chemical Oceanography
NSF: Low-Temperature Geochemistry

Conference session co-chair/convenor

- “Marine organic carbon, ocean-derived aerosols, and particulate nutrient deposition I, II, & III”
(Sessions A51D, A53K, and A54C); Outstanding Student Paper Award (OSPA) Liaison and Judge
2017 AGU Fall Meeting, New Orleans, LA.
- “Radiocarbon insights into the Global Carbon Cycle” (Sessions CO45C & CO51A)
2010 Ocean Sciences Meeting, Portland, OR.

Scientific glass blower

Design, construction, and repair of custom scientific apparatuses (borosilicate and quartz)

PRESENTATIONS (invited)

1. **Beaupré, S.R.** (2018). A methodological perspective on the reactivity of organic carbon in the sea. *College of Chemistry and Chemical Engineering*, Ocean University of China, Qingdao, China.
2. **Beaupré, S.R.** (2018). A methodological perspective on the reactivity of organic carbon in the sea. *Chemistry Department*, University of Georgia, Athens, GA.
3. **Beaupré, S.R.** (2017). Marine dissolved organic matter reactivity and a possible aerosol sink? Insights from radiocarbon (^{14}C) analyses. *Environmental and Climate Sciences Department*, Brookhaven National Laboratory, Upton, NY.
4. Kieber, D.J., Keene, W.C., Long, M.S., Frossard, A.A., **Beaupré, S.R.** (2017). Primary marine aerosol production: Current uncertainties involving interactions among bubbles, marine organic matter, and the sea surface microlayer. Abstract A53K-01. Presented at the AGU Fall Meeting, New Orleans, LA.
5. **Beaupré, S. R.** (2017). Reaction analyses: Biogeochemical insights into complex natural mixtures via kinetics, radiocarbon, and collaborations. *Department of Geosciences*, Stony Brook University, Stony Brook, NY.
6. **Beaupré, S. R.**, Mahmoudi, N., Steen, A. D., & Pearson, A. (2016). Sequential utilization of sedimentary organic matter by heterotrophic bacteria. *National Ocean Sciences Accelerator Mass Spectrometry Facility*. Woods Hole Oceanographic Institution, Woods Hole, MA.
7. **Beaupré, S. R.** (2015). Coupled radiocarbon (^{14}C) and chemical analyses of the origin and reactivity of organic carbon in the sea, *School of Marine and Atmospheric Sciences*, Stony Brook University, Stony Brook, NY.
8. **Beaupré, S. R.** (2015). Radiocarbon (^{14}C) based insights into the biogeochemistry of dissolved organic carbon in the sea, *Guest lecture for Mar 503: Chemical Oceanography*, *School of Marine and Atmospheric Sciences*, Stony Brook University, Stony Brook, NY.
9. **Beaupré, S. R.** (2013). Radiocarbon and reaction analyses, *NOSAMS National Advisory and Planning Board (NAPB) Meeting*, Woods Hole Oceanographic Institution, Woods Hole, MA.
10. **Beaupré, S. R.** (2013). Marine biogeochemical insights from ^{14}C -based reaction analyses, *School of Marine and Ocean Sciences*, Stony Brook University, Stony Brook, NY.
11. **Beaupré, S. R.** (2013). Insights from $\Delta^{14}\text{C}$ -based reaction analyses, *Department of Chemistry, SUNY Environmental Science & Forestry*, Syracuse, NY.
12. **Beaupré, S. R.** (2012). Geochemical insights from ^{14}C -based reaction analyses, *Marine Chemistry & Geochemistry Departmental Seminar*, Woods Hole Oceanographic Institution, Woods Hole, MA.
13. **Beaupré, S. R.** (2012). Geochemical insights from ^{14}C -based reaction analyses, *NOSAMS National Advisory and Planning Board (NAPB) Meeting*, Woods Hole Oceanographic Institution, Woods Hole, MA.
14. **Beaupré, S. R.** (2011). A global radiocarbon mixing line for marine dissolved organic carbon (DOC). *Guest lecture for WHOI-MIT 12.759: Marine Geochemistry Seminar Class*, Woods Hole Oceanographic Institution, Woods Hole, MA.
15. **Beaupré, S. R.** (2011). From atoms to oceans: pursuing the global carbon cycle as a chemical oceanographer, *Massasoit Science Transfer (MST) seminar*, Massasoit Community College, Brockton, MA.
16. **Beaupré, S. R.** (2011). Radiocarbon insights into marine dissolved organic carbon (DOC), *NOSAMS National Advisory and Planning Board (NAPB) Meeting*, Woods Hole Oceanographic Institution, Woods Hole, MA.

17. **Beaupré, S. R.** (2011). A global radiocarbon mixing line for marine dissolved organic carbon (DOC), *Geology & Geophysics Departmental*, Woods Hole Oceanographic Institution, Woods Hole, MA.
18. **Beaupré, S. R.** (2011). Inferring the global distribution of marine dissolved organic radiocarbon (DO¹⁴C), *Marine Chemistry & Geochemistry Department*, Woods Hole Oceanographic Institution, Woods Hole, MA.
19. **Beaupré, S. R.** (2011). The global distribution of marine dissolved organic radiocarbon (DO¹⁴C), *WHOI Postdoc Symposium*, Woods Hole Oceanographic Institution, Woods Hole, MA.
20. **Beaupré, S. R.**, M. L. Roberts, and J. R. Burton (2011). Continuous flow accelerator mass spectrometry gas ion source interface development, *NOSAMS National Advisory and Planning Board (NAPB) Meeting*, Woods Hole Oceanographic Institution, Woods Hole, MA.
21. **Beaupré, S. R.** (2010). Serial UV-oxidation of marine dissolved organic carbon (DOC) and biogeochemical implications, *WHOI Postdoc Symposium*, Woods Hole Oceanographic Institution, Woods Hole, MA.
22. **Beaupré, S. R.** (2009). Sample preparation methods for ¹⁴C analyses. *Guest instructor: Radiocarbon in Ecology and Earth System Science short course*, UC Irvine, Irvine, CA.
23. **Beaupré, S. R.** (2009). Constraining the ¹⁴C composition of marine dissolved organic carbon (DOC), *Department of Earth Sciences*, University of Southern California, Los Angeles, CA.
24. **Beaupré, S. R.** (2006). Marine dissolved organic carbon. *Guest lecture: Radiocarbon in Ecology and Earth System Science short course*, UC Irvine, Irvine, CA.
25. **Beaupré, S. R.** (2005). Marine dissolved organic carbon. *Guest lecture: Radiocarbon in Ecology and Earth System Science short course*, UC Irvine, Irvine, CA.

PRESENTATIONS (contributed)

1. **Beaupré, S. R.**, Kieber, D. J., Keene, W. C., Long, M. S., Lu, X., Frossard, A.A., Kinsey, J. D., Duplessis, P., Chang, R., Maben, J.R., Yuting, Z., Bisgrove, J. (2018). Radiocarbon (¹⁴C) Constraints On The Fraction Of Refractory Dissolved Organic Carbon In Primary Marine Aerosol From The Northwest Atlantic. Presented at the 23rd International Radiocarbon Conference, Trondheim, Norway.
2. Walker, B. D., **Beaupré, S. R.**, Griffin, S., Druffel, E. R. M. (2018). UV photochemical extraction of marine dissolved organic carbon for concentration and isotopic measurements at UC Irvine: status, surprises, and recommendations. Presented at the 23rd International Radiocarbon Conference, Trondheim, Norway.
3. Taylor, G. T., Suter, E. A., Zaliznyak, T., **Beaupré, S. R.** (2018). A Method to Measure Inter- and Intra-Specific Variability in Primary Productivity: Stable Isotope Probing and Single-Cell Resonance Raman Microspectrometry. Presented at the 2018 OCB Summer Workshop, Woods Hole, MA
4. Kieber, D.J., **Beaupré, S.R.**, Keene, W.C., Long, M.S., Frossard, A.A., Kinsey, J.D., Duplessis, P., Maben, J.R., Lu, X., Chang, R., Zhu, Y., Bisgrove, J. (2018). Primary Marine Aerosol Production and Refractory Marine Organic Matter Cycling: Interactions Among Bubbles, Marine Organic Matter, and the Sea Surface Microlayer. Abstract AI43A-08. Presented at the Ocean Sciences Meeting, Portland, OR.
5. Zigah, P.K., McNichol, A.P., **Beaupré, S.R.**, Xu, L., Repeta, D.J., Aluwihare, L. (2018). Serial Thermal Oxidation Radiocarbon Analyses of Marine Dissolved Organic Carbon (DOC): Insights into the Cycling of major DOC fractions. Abstract OD44A-2788. Presented at the Ocean Sciences Meeting, Portland, OR

6. **Beaupré, S.R.**, Kieber, D.J., Keene, W.C., Long, M.S., Frossard, A.A., Kinsey, J.D., Duplessis, P., Chang, R., Maben, J.R., Lu, X., Zhu, Y., Bisgrove, J. (2017). Radiocarbon (^{14}C) Constraints On The Fraction Of Refractory Dissolved Organic Carbon In Primary Marine Aerosol From The Northwest Atlantic. Abstract A54C-05. Presented at the AGU Fall Meeting, New Orleans, LA.
7. Mahmoudi, N., Enke, T., **Beaupré, S.R.**, Teske, A., Corder, O.X., Pearson, A. (2017). Elucidating Microbial Species-Specific Effects on Organic Matter Transformation in Marine Sediments. Abstract B11A-1655. Presented at the AGU Fall Meeting, New Orleans, LA.
8. Duplessis, P., Chang, R., Frossard, A.A., Keene, W.C., Maben, J.R., Long, M.S., **Beaupré, S.R.**, Kieber, D.J., Kinsey, J.D., Zhu, Y., Lu, X., Bisgrove, J. (2017). Influences of Scavenging and Removal of Surfactants by Bubble Processing on Primary Marine Aerosol Production from North Atlantic Seawater. Abstract A51D-2092. Presented at the AGU Fall Meeting, New Orleans, LA.
9. Long, M.S., Keene, W.C., Maben, J.R., Chang, R., Duplessis, P., Kieber, D.J., **Beaupré, S.R.**, Frossard, A.A., Kinsey, J.D., Zhu, Y., Lu, X., Bisgrove, J. (2017). Simulating Bubble Plumes from Breaking Waves with a Forced-Air Venturi. Abstract A51D-2091. Presented at the AGU Fall Meeting, New Orleans, LA.
10. Kieber, D.J., Long, M.S., Keene, W.C., Kinsey, J.D., Frossard, A.A., **Beaupré, S.R.**, Duplessis, P., Maben, J.R., Lu, X., Chang, R., Zhu, Y., Bisgrove, J. (2017). Dynamic Bubble Surface Tension Measurements in Northwest Atlantic Seawater. Abstract A51D-2093. Presented at the AGU Fall Meeting, New Orleans, LA.
11. Keene, W.C., Long, M.S., Duplessis, P., Kieber, D.J., Maben, J.R., Frossard, A.A., Kinsey, J.D., **Beaupré, S.R.**, Lu, X., Chang, R., Zhu, Y., Bisgrove, J. (2017). Properties and Fluxes of Primary Marine Aerosol Generated Via Detrainment of Turbulence-Modulated Bubble Plumes from Fresh North Atlantic Seawater. A53K-05. Presented at the AGU Fall Meeting, New Orleans, LA.
12. Frossard, A.A., Gérard, V., Duplessis, P., Kinsey, J., Lu, X., Zhu, Y., Bisgrove, J., Maben, J.R., Long, M.S., Chang, R., **Beaupré, S.R.**, Kieber, D.J., Keene, W.C., Nozière, B., Cohen, R.C. (2017). Contribution of seawater surfactants to generated primary marine aerosol particles. Abstract A53K-02. Presented at the AGU Fall Meeting, New Orleans, LA.
13. **Beaupré, S. R.**, Mahmoudi, N., & Pearson, A. (2016). Characterizing the microbial lability and isotopic (^{14}C , ^{13}C) signatures of marine organic matter with a novel culture vessel system. Abstract (MM24A-0425). Presented at the Ocean Sciences Meeting, AGU/ASLO/TOS, New Orleans, LA, 21-27 Feb. poster
14. Mahmoudi, N., **Beaupré, S. R.**, & Pearson, A. (2016). Investigating microbial cycling of recalcitrant organic matter in marine sediments using natural isotope respirometry in a novel, carbon-free bioreactor. Abstract (MM24A-0420). Presented at the Ocean Sciences Meeting, AGU/ASLO/TOS, New Orleans, LA, 21-27 Feb. poster
15. Zigah, P., **Beaupré, S. R.**, Repeta, D. J., McNichol, A. P., Xu, L., & Aluwihare, L. I. (2016). Cycling of marine dissolved organic carbon: New insights from radiocarbon distribution within carboxylic-rich alicyclic molecules and acylated heteropolysaccharides. Abstract (CT43A-08). Presented at the Ocean Sciences Meeting, AGU/ASLO/TOS, New Orleans, LA, 21-27 Feb.
16. Mahmoudi, N., **Beaupré, S.R.**, Steen, A. D., & Pearson, A. (2016). Investigating the bioavailability and degradation of organic matter in deep sea sediments using the IsoCaRB system. *Center for Dark Energy Biosphere Investigations C-DEBI Annual Meeting*. Marina, CA. poster
17. Mahmoudi N., **Beaupré, S.R.**, Steen, A.D., Pearson, A. (2016) IsoCaRB: A novel bioreactor system to characterize microbial carbon cycling and the lability of natural organic matter. *16th International Symposium on Microbial Ecology (ISME)*, Montreal, Canada. poster.

18. Mahmoudi, N., **Beaupré, S. R.**, Steen, A. D., & Pearson, A. (2016). Sequential bioavailability of sedimentary organic matter to heterotrophic bacteria. *Gordon Research Conference GRC Organic Geochemistry*. Holderness, NH. poster.
19. Mahmoudi, N., **Beaupré, S. R.**, Steen, A. D., & Pearson, A. (2016). Investigating microbial C cycling in sediments using the IsoCaRB system. *American Society for Microbiology ASM General Meeting*. Boston, MA. poster.
20. Zigah, P., Repeta, D., McNichol, A., **Beaupré, S.R.**, Xu, L., Aluwihare, L.I., Hemingway, G. (2015). Constraining the radiocarbon distribution within major components of marine dissolved organic carbon. *AGU Fall Meeting*, San Francisco, CA. poster.
21. Burton, J.R., M.L. Roberts, **S. R. Beaupré** (2015), ^{14}C measurements of organic samples using a gas ion source. *NOSAMS National Advisory and Planning Board (NAPB) Meeting*, Woods Hole Oceanographic Institution, Woods Hole, MA.
22. **Beaupre, S. R.**, M. L. Roberts, J. R. Burton, and R. Summons (2012), High-Resolution Radiocarbon Chronology Of Ooids By Gas Ion Source Accelerator Mass Spectrometry, *Abstract V11F-07 presented at 2012 Fall Meeting, San Francisco, CA, Dec 3-7*.
23. **Beaupré, S. R.** (2012), Inferring the global distribution of marine dissolved organic radiocarbon, *2012 Ocean Sciences Meeting, Salt Lake City, UT*.
24. **Beaupré, S. R.**, and T. I. Eglinton (2012), POC provenance insights from ramped thermal degradation and ^{14}C analyses, *21st International Radiocarbon Conference, Paris, FR*.
25. **Beaupré, S. R.**, M. L. Roberts, and T. I. Eglinton (2012), POC provenance insights from ramped thermal degradation and ^{14}C analyses, *2012 Ocean Carbon and Biogeochemistry (OCB) Summer Science Workshop, Woods Hole, MA*.
26. Plante, A. F., **S. R. Beaupré**, M. L. Roberts, and T. Baisden (2012), Distribution of radiocarbon ages in soil organic matter by thermal fractionation, *21st International Radiocarbon Conference, Paris, FR*.
27. Roberts, M. L., **S. R. Beaupré**, and J. R. Burton (2012), Carbonate Samples: Is Pretreatment Necessary?, *21st International Radiocarbon Conference, Paris, FR*.
28. Roberts, M. L., J. R. Burton, and **S. R. Beaupré** (2012), High-Throughput Low-Cost Analysis of Carbonate Samples for ^{14}C , *21st International Radiocarbon Conference, Paris, FR*.
29. Rosenheim, B., B. Roberts, V. Galy, M. Allison, A. Kolker, **S. R. Beaupré**, and K. Roe (2012), Ramped pyrolysis radiocarbon age distributions in riverine POC, *21st International Radiocarbon Conference, Paris, FR*.
30. Walker, B., M. D. McCarthy, **S. R. Beaupre**, E. Druffel, and T. Guilderson (2012), Evidence for the size-age-composition continuum of marine organic matter: implications for carbon cycling in the coastal and open ocean, *21st International Radiocarbon Conference, Paris, FR*.
31. Walker, B. D., **S. R. Beaupré**, T. P. Guilderson, E. R. M. Druffel, and M. D. McCarthy (2012), Molecular size as a master variable governing the age of the marine dissolved organic carbon reservoir, *2012 Ocean Sciences Meeting, Salt Lake City, UT, Abstract 9772*.
32. **Beaupré, S. R.** (2011), The global distribution of marine dissolved organic radiocarbon, *Gordon Research Conference on Chemical Oceanography, Andover, NH*.
33. Plante, A. F., J. M. Fernández, **S. R. Beaupré**, M. L. Roberts, and T. Baisden (2011), Distribution of radiocarbon ages of soil organic matter by thermal fractionation, *AGU Fall Meeting, Abstract B31A-0311 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec*.

34. Roberts, M. L., K. F. von Reden, J. R. Burton, C. P. McIntyre, and **S. R. Beaupré** (2011), A gas-accepting ion source for accelerator mass spectrometry: progress and applications, *AMS-12 Accelerator Mass Spectrometry Conference, Wellington, New Zealand*.
35. von Reden, K. F., M. L. Roberts, J. R. Burton, and **S. R. Beaupré** (2011), Optimizing a microwave gas ion source for continuous flow accelerator mass spectrometry (CFAMS), *14th International Conference on Ion Sources (ICIS), Giardini Naxos, Italy, 2011*.
36. **Beaupré, S. R.**, and L. I. Aluwihare (2010), Constraining the two component model of marine dissolved organic radiocarbon, *2010 Ocean Sciences Meeting, Portland OR, 91(26)*, Abstract CO45C-01.
37. Druffel, E. R. M., S. Griffin, **S. R. Beaupré**, and J. Hwang (2009), Variability of dissolved inorganic radiocarbon at a surface site in the Northeast Pacific, *20th International Radiocarbon Conference, Kailua-Kona, HI 96740, USA*.
38. Griffin, S., **S. R. Beaupré**, and E. R. M. Druffel (2009), An alternative method of diluting dissolved organic carbon (DOC) high concentrate samples for ^{14}C analysis, *20th International Radiocarbon Conference, Kailua-Kona, HI 96740, USA*.
39. **Beaupré, S. R.**, and E. R. M. Druffel (2008), Marine dissolved organic carbon (DOC) serial-oxidations, radiocarbon, and biogeochemical implications, *IMBER IMBIZO Meeting, Miami, FL*.
40. **Beaupré, S. R.**, and E. R. M. Druffel (2008), Oceanic time-series of dissolved organic carbon (DOC) concentrations and $\Delta^{14}\text{C}$ values, *EOS Transactions of the American Geophysical Union, Ocean Sci. Meet. Suppl.*, Abstract 1571.
41. **Beaupré, S. R.**, and E. R. M. Druffel (2008), UV-Induced Serial-oxidations of Marine Dissolved Organic Carbon (DOC) and Biogeochemical Implications, *EOS Transactions of the American Geophysical Union, 89(53)*, Fall Meeting Suppl., Abstract OS11B-1130.
42. Walker, B. D., **S. R. Beaupré**, L. A. Roland, T. P. Guilderson, E. R. M. Druffel, and M. D. McCarthy (2007), Carbon isotopic composition and reactivity across the dissolved organic matter continuum, *ASLO Aquatic Sciences Meeting, Santa Fe, NM, Poster presentation*.
43. **Beaupré, S. R.** (2006), Marine dissolved organic carbon isotope photochemistry, *Dissertations Symposium on Chemical Oceanography (DISCO) XX, Honolulu, HI*.
44. **Beaupré, S. R.**, E. R. M. Druffel, and S. Griffin (2006), Marine DOC concentration and radiocarbon measurements in the NE Pacific, *EOS Transactions of the American Geophysical Union, 87(36)*, Ocean Sci. Meet. Suppl., Abstract OS12K-04.
45. **Beaupré, S. R.**, E. R. M. Druffel, and S. Griffin (2005), A modified technique for the measurement of marine DOC concentrations and isotope ratios, *Ocean Carbon and Climate Change Workshop, Woods Hole Oceanographic Institution, Poster presentation*.
46. Santos, G. M., J. R. Southon, S. Griffin, **S. R. Beaupré**, and E. R. M. Druffel (2005), Ultra small-mass ^{14}C -AMS sample preparation and analysis at the KCCAMS facility, *Nuclear Instruments & Methods in Physics Research, Section B - Beam Interactions With Materials and Atoms*, poster abstract.
47. **Beaupré, S. R.**, J. Hwang, and E. R. M. Druffel (2004), Marine DOC radiocarbon methods and DOC/POC exchange, *EOS Transactions of the American Geophysical Union, 85(47)*, Fall Meet. Suppl., Abstract OS51C-1324.
48. **Beaupré, S. R.**, E. R. M. Druffel, S. Griffin, and D. J. Kieber (2003), Using carbon isotope ratios to assess DOC photochemistry, *EOS Transactions of the American Geophysical Union, 84(52)*, Ocean Sci. Meet. Suppl., Abstract OS41E-01.

49. Druffel, E. R. M., S. Griffin, J. Hwang, T. Komada, and **S. R. Beaupré** (2003), Turnover of dissolved and particulate organic carbon in the open ocean, *EOS Transactions of the American Geophysical Union*, 84(52), Ocean Sci. Meet. Suppl., Abstract OS41C-02.
50. Trumbore, S., I. Dioumaeva, M. Litvak, M. Goulden, and **S. R. Beaupré** (2001), Temperature and disturbance controls on soil respiration in northern boreal forests, in *American Geophysical Union, Fall Meeting*, Abstract B12F-06.
51. **Beaupré, S. R.**, D. J. Kieber, and K. Mopper (1999), Ultraviolet absorbance and photobleaching in the Gulf of Maine and Northwest Atlantic Ocean, *EOS Transactions of the American Geophysical Union*, 80(49), Ocean Sciences Meet. Suppl., Abstract OS128.
52. Jankowski, J. J., **S. R. Beaupré**, D. J. Kieber, K. Mopper, and B. D. Hofsetz (1999), Concentration and photochemical production of nitrite in Antarctic seawater, *EOS Transactions of the American Geophysical Union*, 80(49), Ocean Sciences Meeting Suppl., Abstract OS271.

Current:

Project/Proposal: "Collaborative Research: Coupled Ocean-Atmosphere Recycling of Refractory Dissolved Organic Carbon"

Source of Support: NSF Chemical Oceanography

Total Award Amount: \$185,535

Total Award Period: 9/1/2015 - 12/31/2018

Location of Project: Stony Brook University, Stony Brook, NY

Project/Proposal: "Quantifying the photochemical reactivity of refractory marine dissolved organic matter: a novel methodological approach"

Source of Support: Minghua Zhang Early Career Faculty Innovation Fund

Total Award Amount: \$34,000

Total Period of Award: 11/1/2017 - 12/31/2018

Location of Project: Stony Brook University, Stony Brook, NY

Pending:

N/A

***Curriculum vitae* for Robert M. Cerrato**

Professor

School of Marine and Atmospheric Sciences

Stony Brook University, Stony Brook, NY 11794-5000

Phone: (631) 632-8666; Fax: (631) 632-8915; e-mail: Robert.Cerrato@stonybrook.edu

PROFESSIONAL PREPARATION

<u>College/University</u>	<u>Major</u>	<u>Degree</u>	<u>Year</u>
Drexel University	Physics	B.Sc.	1972
Yale University	Geology & Geophysics	M.Phil.	1974
Yale University	Geology & Geophysics	Ph.D.	1980

APPOINTMENTS

2018	Professor, Stony Brook University
1992-2018	Associate Professor, Stony Brook University
2004-present	Adjunct Associate Professor, Department of Natural Resources Science, University of Rhode Island, Kingston, RI
1986-92	Assistant Professor, State University of New York at Stony Brook
1980-86	Assistant Research Professor, State University of New York at Stony Brook

PUBLICATIONS

Recent Publications Most Closely Related to Proposal

- Hornstein, J., E. Pales Espinosa, R.M. Cerrato, K.M.M. Lwiza, B. Allam. 2018. The influence of temperature stress on the physiology of the Atlantic surfclam, *Spisula solidissima*. *Comparative Biochemistry and Physiology, Part A* 222: 66-73.
- Flanagan A.M., R.D. Flood, M.G. Frisk, C.D. Garza, G.R. Lopez, N.P. Maher, R.M. Cerrato. 2018. The relationship between observational scale and explained variance in benthic communities. *PLoS ONE* 13(1): e0189313. <https://doi.org/10.1371/journal.pone.0189313>
- Pales Espinosa, E., R.M. Cerrato, G. Wikfors, B. Allam. 2016. Modeling food choice in suspension-feeding bivalves, *Crassostrea virginica* and *Mytilus edulis*. *Mar. Biol.* 163: 40-53.
- Gallagher, B.K., L.A. Hice, A.E. McElroy, R.M. Cerrato, and M.G. Frisk. 2015. Factors Influencing Daily Growth in Young-of-the-Year Winter Flounder along an Urban Gradient Revealed Using Hierarchical Linear Models. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*, 7: 200-219
- Cerrato, R.M., P.V. LoCicero, S.L. Goodbred. 2013. Response of mollusc assemblages to climate variability and anthropogenic activities: A 4000-year record from a shallow bar-built lagoon system. *Global Change Biology* 19: 3024-3036.

Other Recent Publications

- Phillips, J.M., V. M. Bricelj, M. Mitch, R.M. Cerrato, S. MacQuarrie, L.B. Connell. 2018. Biogeography of resistance to paralytic shellfish toxins in softshell clam, *Mya arenaria* (L.), populations along the Atlantic coast of North America. *Aquatic Toxicology* 202: 196-206.
- Martinez, C., Duplisea, D., Cerrato, R., Frisk, M. 2017. Exploration of Interspecific Abundance-Occupancy Relationships using Empirically Derived Simulated Communities. *PLoS ONE* 12(1): e0170816. doi:10.1371/journal.pone.0170816
- Lee C-S, M.E. Lutcavage, E. Chandler, D.J. Madigan, R.M. Cerrato, N.S. Fisher. 2016. Declining mercury concentrations in bluefin tuna reflect reduced emissions into the North Atlantic. *Env. Sci. Tech.* 50(23): 12825-12830.

- Flanagan, A.M. and R.M. Cerrato. 2015. Testing the utility of the classic Folk (1954) grain size classes in quantitatively describing benthic community structure in soft-sediment, estuarine environments. *Continental Shelf Research* 109: 55-66.
- Sagarese, S.R., M.G. Frisk, R.M. Cerrato, K.A. Sosebee, J.A. Musick, and P.J. Rago. 2014. Application of generalized additive models to examine ontogenetic and seasonal distributions of spiny dogfish (*Squalus acanthias*) in the Northeast (US) shelf large marine ecosystem. *Can J. Fish. Aqu. Sci.* 71: 847-877.
- McNamara, M.E., D.J. Lonsdale, and R.M. Cerrato. 2014. The role of eutrophication in structuring planktonic communities in the presence of the ctenophore *Mnemiopsis leidyi*. *Mar. Ecol. Prog. Ser.* 510: 151-165

SYNERGISTIC ACTIVITIES

Example 1: Colleagues, students, and I have found strong evidence suggesting that the decline in extensive populations of suspension feeders in shallow, enclosed bays on Long Island has altered the food web structure of the plankton, has resulted in the collapse of a positive feedback loop between the bivalves and the plankton, and has contributed to the abundance of the toxic brown tide alga *Aureococcus anophagefferens*. This research has also suggested that rapid recovery may not occur unless stocks are rebuilt to a large enough size to restore lost function and management agencies work at a more regional level. This research has resulted in several large-scale shellfish restoration efforts on Long Island.

Example 2: Past and current research includes an effort to discover and test new environmental variables derived from sonar and grain-size data and to develop multivariate direct gradient techniques for analyzing biotic-environmental data in space and time. Benthic mapping associated with this research is being used by managers to assess new aquaculture lease sites. It is also being used to study the temporal and spatial patterns in finfish and mobile benthic invertebrate assemblages collected in long-term monitoring studies with the goal of deriving metrics that can be used by managers to assess the health of an ecosystem.

Example 3: One current graduate and one recent PhD student were McNair Scholars recruited from California State University at Monterey Bay. The McNair Scholars Program aids students traditionally underrepresented in graduate education.

Example 4: Created and/or helped develop several SoMAS undergraduate programs (BA in Environmental Studies, BS in Marine Sciences, BS in Marine Vertebrate Biology, BA in Sustainability Studies) and one graduate program (MA in Marine Conservation and Policy)

COLLABORATORS AND OTHER AFFILIATIONS

Collaborators Over The Last 48 Months: Stony Brook: B. Allam, R. Flood, N. Fisher, M. Frisk, D. Lonsdale, K. Lwiza, G. Lopez, A. McElroy, J. Nye, J. Olin, E. Pales Espinosa; G. Wikfors (Northeast Fisheries Science Center); E. Chandler (U. Mass.), L. Connell (U. Maine), D. Duplisea (Fisheries and Oceans Canada), C. Garza (Cal. State Univ.), A. Jordaan (U. Mass. Amherst), M. Lutcavage (U. Mass.), D. Madigan (Harvard U.), S. Sagarese (Southeast Fisheries Science Center)

Graduate and Postdoctoral Advisors: D.C. Rhoads (Retired) and J. R. Vaisnys (Retired)

Thesis Advisor and Postgraduate Scholar Sponsors over the Last Five Years: Jill Olin (Postdoc, Stony Brook University), Jeronimo Pan (Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina), Alison Flanagan (USGS Western Ecological Research Center), Tyler Abruzzo (H2M Consulting), Maren Mitch (current), Justin Bopp (current), Karin Schweitzer (current). **Total Number of Graduate Students advised: 30**

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.				
Investigator: Robert M. Cerrato		Other agencies (including NSF) to which this proposal has been/will be submitted.		
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Horseshoe Crab Acoustic Telemetry Source of Support: NYS Department of Environmental Conservation Total Award Amount: \$250,067 Total Award Period Covered: 2016-2019 Location of Project: Moriches Bay Person-Months Per Year Committed to the Project. 0.5 Cal: X Acad: Sumr:				
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Nearshore Ocean Trawl Survey Source of Support: NYS Department of Environmental Conservation Total Award Amount: \$1,760,703 Total Award Period Covered: 2017-2020 Location of Project: Atlantic Ocean south of Long Island Person-Months Per Year Committed to the Project. 1 Cal: Acad: Sumr: X				
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Horseshoe Crab Spawning Survey Source of Support: NYS Department of Environmental Conservation Total Award Amount: \$166,000 Total Award Period Covered: 2017-2019 Location of Project: Long Island Person-Months Per Year Committed to the Project. 0.5 Cal: X Acad: Sumr:				
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Atlantic Ocean Surf Clam Population Survey Source of Support: NYS Department of Environmental Conservation Total Award Amount: \$307,224 Total Award Period Covered: 2017-2021 Location of Project: Atlantic Ocean south of Long Island Person-Months Per Year Committed to the Project. 0.5 Cal: Acad: Sumr: X				
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Assessing blue crab abundance and life history characteristics and predicting future population trends on Long Island Source of Support: NYS Department of Environmental Conservation Total Award Amount: \$701,923 Total Award Period Covered: 2014-2019 Location of Project: Great South Bay Person-Months Per Year Committed to the Project. 0.5 Cal: Acad: Sumr: X				

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.			
Investigator: Robert M. Cerrato		Other agencies (including NSF) to which this proposal has been/will be submitted.	
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Effect of current and projected climate conditions on the Atlantic Surfclam <i>Spisula solidissima</i>			
Source of Support: New York Sea Grant Total Award Amount: \$199978 Total Award Period Covered: 2019-2021 Location of Project: Atlantic Ocean south of Long Island Person-Months Per Year Committed to the Project. Cal: Acad: Sumr: 0.5			
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Comparing the performance of diploid and triploid eastern oysters in the Mid-Atlantic and Northeast			
Source of Support: Saltonstall-Kennedy Competitive Research Program Total Award Amount: \$295,000 Total Award Period Covered: 2019-2021 Location of Project: Aquaculture sites in MD, NJ, NY, RI, and ME Person-Months Per Year Committed to the Project. Cal: Acad: Sumr: 0.5			
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Assessing vulnerability of species and communities to environmental change			
Source of Support: New York State Department of Environmental Conservation Total Award Amount: \$199,855 Total Award Period Covered: 2019-2021 Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: 0.5 Sumr:			
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title:			
Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:			
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title:			
Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:			
*If this project has previously been funded by another agency, please list and furnish information for immediately pre- ceding funding period.			



BIOGRAPHICAL SKETCH

Jackie Lynne Collier

School of Marine and Atmospheric Sciences and Graduate Program in Ecology and Evolution
Stony Brook University, Stony Brook, NY 11794-5000

(a) Professional Preparation

University of Texas	Austin, TX	Molecular Biology	B.S., 1987
Stanford University	Palo Alto, CA	Biological Sciences	Ph.D., 1994
Scripps Inst. Oceanography	San Diego, CA	NSF Postdoctoral Fellow	1994 to 1996

(b) Appointments

Associate Professor, School of Marine and Atmospheric Sciences, Stony Brook University (SBU)	9/2010 to present
Associate Professor, Graduate Program in Ecology and Evolution, SBU	1/2012 to present
Assistant Professor, SoMAS, SBU	1/2002 to 8/2010
Assistant Professor, Biology Dept, Rensselaer Polytechnic Institute	9/96 to 12/01

(c) Publications (*indicates student co-authors)

5 most closely related

- Ye, C., W. Qiao, X. Yu, X. Ji, H. Huang, **J.L. Collier**, L. Liu. 2015. Reconstruction and analysis of the genome-scale metabolic model of *Schizochytrium limacinum* SR21 for docosahexaenoic acid production. **BMC Genomics 16:799 (11pp)**. (doi: 10.1186/s12864-015-2042-y)
- Keeling, P.J. and 80 others in alphabetical order including **J. L. Collier** and ending A. Z. Worden. 2014. The Marine Microbial Eukaryote Transcriptome Sequencing Project (MMETSP): Illuminating the Functional Diversity of Eukaryotic Life in the Oceans through Transcriptome Sequencing. **PLoS Biology 12(6):e1001889**. DOI: 10.1371/journal.pbio.1001889
- Collado Mercado, E.*, J.C. Radway, and **J.L. Collier**. 2010. Novel uncultivated labyrinthulomycetes revealed by 18S rDNA sequences from seawater and sediment samples. **Aquatic Microbial Ecology 58:215-228**. (doi: 10.3354/ame01361)
- Liu, Q.*, B. Allam, and **J.L. Collier**. July 2009. Quantitative real-time PCR assay for QPX (Thraustochytriidae), a parasite of the hard clam (*Mercenaria mercenaria*). **Applied and Environmental Microbiology 75(14):4913-4918**. (doi: 10.1128/AEM.00246-09)
- Qian, H.*, Q. Liu*, B. Allam, and **J.L. Collier**. 2007. Molecular genetic variation within and among isolates of QPX (Thraustochytridae), a parasite of the hard clam (*Mercenaria mercenaria*). **Diseases of Aquatic Organisms 77:159-168**. (doi: 10.3354/dao01848)

5 other publications

- Liu, Q*, **J.L. Collier**, and B. Allam. 2017. Seasonality of QPX disease in the Raritan Bay (NY) wild hard clam (*Mercenaria mercenaria*) population. **Aquaculture Research 48(3): 1269-1278**. DOI: 10.1111/are.12969
- Collier, J.L.**, S. Geraci-Yee*, O. Lilje, and F. H. Gleason. 2017. Possible impacts of zoosporic parasites in diseases of commercially important marine mollusc species: part II. Labyrinthulomycota. **Botanica Marina 60(4):409-417**. DOI: <https://doi.org/10.1515/bot-2016-0133>

Collier, J.L., S.P. Fitzgerald*, L.A. Hice, M.G. Frisk, A.E. McElroy. 2014. A New PCR-Based Method Shows That Blue Crabs (*Callinectes sapidus* (Rathbun)) Consume Winter Flounder (*Pseudopleuronectes americanus* (Walbaum)). *PLoS ONE* 9(1): e85101. (doi:10.1371/journal.pone.0085101)

Gobler, C.J., D.L. Berry, S.T. Dyhrman, S.W. Wilhelm, A. Salamov, A.V. Lobanov, Y. Zhang, **J.L. Collier**, 25 others. 2011. Niche of harmful alga *Aureococcus anophagefferens* revealed through ecogenomics. ***Proceedings of the National Academy of Sciences of the United States of America* 108(11): 4352-4357. (doi: 10.1073/pnas.1016106108)**

Collier, J.L., K.M. Baker*, and S.L. Bell*. 2009. Diversity of urea-degrading microorganisms in open-ocean and estuarine planktonic communities. *Environmental Microbiology* 11(12):3118-3131. (doi: 10.1111/j.1462-2920.2009.02016.x)

(d) Synergistic Activities

Graduate Education

I have been heavily involved in graduate education at SoMAS not only in serving as a thesis advisor, but also in the formal, classroom-based components of our program. I regularly co-teach two courses required of all marine-track first-year graduate students: MAR508 (Marine Biogeochemistry) and MAR568 (Scientific Communication). I was involved in the creation of the syllabi and content of both courses.

High School and Undergraduate Student Research Experience

My lab has been active in hosting students (~40 to date) from a variety of educational levels and backgrounds. A local High School student, Maiko Kume, who spent the summer of 2003 in the lab, became an Intel SemiFinalist with her project.

Reviewing

I served as a reviewing editor for Aquatic Microbial Ecology from 2006 to 2014, and have been serving as an associate editor for Journal of Phycology since 2014. I serve as an ad hoc reviewer for a variety of journals including Applied and Environmental Microbiology, Estuaries, Hydrobiologia, Journal of Bacteriology, Journal of Phycology, Limnology & Oceanography, Marine Chemistry, Marine Ecology Progress Series, Research in Microbiology and several funding agencies.

Community Connections

I regularly serve as a judge in local science fairs and participate in the 'Meet an Oceanographer' program organized by my colleague Emmanuelle Pales-Espinosa at the Riverhead Aquarium.

Communicating Uncertainty

I am working with the National Center for Science & Civic Engagement (NCSCE) via SENCER (Science Education for New Civic Engagements and Responsibilities), and in collaboration with the Alan Alda Center for Communicating Science, to develop education, training, and outreach materials designed to help scientists better communicate about scientific uncertainty to a broad variety of audiences, and to help nonscientists understand what scientists mean when we talk about scientific uncertainty.

Current & Pending Support

J. L. COLLIER

Current Grants

1. Expanding the Genetic Tool Kit for *Aurantiochytrium*
PI: J.L. Collier
Co-PI(s): J.S. Rest
Source: Gordon and Betty Moore Foundation
Award: \$ 180,207 (\$163,966 direct) for 8/25/17 to 03/01/2019
Location: Stony Brook University
Commitment: 1 summer month per year

2. Tools and Methods for the Consistent, Efficient Genetic Manipulation of *Aurantiochytrium*
PI: J.L. Collier
Co-PI(s): J.S. Rest, G. Balazsi
Source: Gordon and Betty Moore Foundation
Award: \$ 300,259 direct) for 10/12/2018 to 10/14/2020
Location: Stony Brook University
Commitment: 0.5 summer month per year

Pending Grants

None

Curriculum Vitae:

CHRISTOPHER J. GOBLER, PhD
ASSOCIATE DEAN AND PROFESSOR
SCHOOL OF MARINE AND ATMOSPHERIC SCIENCES
STONY BROOK UNIVERSITY
SOUTHAMPTON, NY 11968
christopher.gobler@stonybrook.edu

EDUCATION

1999	Ph.D.	Coastal Oceanography	Stony Brook University
1995	M.S.	Marine Environmental Science	Stony Brook University
1992	B.A.	Biology	University of Delaware

POSITION

2015 – : Director of the New York State Center for Clean Water Technology at Stony Brook University
2014- 2018: Associate Dean of Research, School of Marine and Atmospheric Sciences, Stony Brook University

2012- : Professor, Director of Academic Programs on the Stony Brook - Southampton campus, School of Marine and Atmospheric Sciences, Stony Brook University

2005 – 2012: Associate Professor, Director of Academic Programs on the Stony Brook - Southampton campus, School of Marine and Atmospheric Sciences, Stony Brook University

2004 – 2006: Associate Professor of Marine Science and Biology, Southampton College, Long Island University, Southampton, NY.

2001 – 2005: Marine Science Program Coordinator, Southampton College of Long Island University, Southampton, NY.

1999 - 2004: Assistant Professor of Marine Science and Biology, Southampton College, Long Island University, Southampton, NY.

HONORS AND AWARDS

2016 - 2025: Founding member of the GlobalHAB Scientific Steering Committee established by the Intergovernmental Oceanographic Commission of UNESCO.

2016: Environmental Champion award, US EPA

2015: Congressional briefing to the US House of Representatives and the US Senate on “The Challenge of Ocean Acidification”, organized by Environmental Defense Fund

2014: Dennis Puleston Environmental Achievement Award by the Pine Barrens Society

2104: Congressional briefing to the US House of Representatives and the US Senate on “The Challenge of Ocean Acidification”, organized by NOAA

2013: Congressional Testimony before the US House of Representatives subcommittee on Water Resources and Environment hearings on the 2013 Water Resources Development Act

2012: Environmental Equinox Award, Citizens Campaign for the Environment, NY, USA

2011: Discovery of the Year Award by NPR affiliate, WCAI, Climatide,

2009: Bay Guardian Award, Water Keepers Alliance, USA

2008 - 2014: Elected member of the US National Harmful Algal Bloom Committee, commissioned by United States Congress;

TEN (10) PUBLICATIONS

Gobler CJ, Clark, H., Griffith AW, Lusty M. 2017. Diurnal Fluctuations in Acidification and Hypoxia Reduce Growth and Survival of Larval and Juvenile Bay Scallops (*Argopecten irradians*) and Hard Clams (*Mercenaria mercenaria*). *Frontiers in Marine Science* 3, 282.

Gobler CJ, Baumann H. 2016. Hypoxia and acidification in ocean ecosystems: Coupled dynamics and effects on marine life. *Biology Letters*, 12(5), 20150976.

Clark H, **Gobler CJ**. 2016 Diurnal fluctuations in CO₂ and dissolved oxygen concentrations do not provide a refuge from hypoxia and acidification for early-life-stage bivalves. Featured article in *Marine Ecology Progress Series* 558, 1-14.

CS Young, **CJ Gobler**. 2016. Ocean Acidification Accelerates the Growth of Two Bloom-Forming Macroalgae. *PloS one* 11 (5), e0155152

Gobler CJ, Talmage SC. 2013. Short and long term consequences of larval stage exposure to constantly and ephemerally elevated carbon dioxide for marine bivalve populations. In press, *Biogeosciences*

Baumann H, Talmage SC, **Gobler CJ**. 2012. Reduced early life growth and survival in a fish as a direct response to elevated CO₂ levels. *Nature Climate Change* 2: 38–41

Talmage SC, **Gobler CJ**. 2012. Effects of carbon dioxide and a harmful alga (*Aureococcus anophagefferens*) on the growth and survival of larval oysters (*Crassostrea virginica*) and scallops (*Argopecten irradians*). *Marine Ecology Progress Series* 464: 121–134

Talmage SC, **Gobler CJ**. 2011. Effects of elevated temperature and carbon dioxide on the growth and survival of larvae and juveniles of three species of Northwest Atlantic bivalves. *PLoS One*. Volume 6 | Issue 10 | e26941

Talmage SC, **Gobler CJ**. 2010. Effects of past, present, and future ocean carbon dioxide concentrations on the growth and survival of larval shellfish. *Proceedings of the National Academy of Sciences of the United States of America*. 107: 17246-17251

Talmage SC, **Gobler CJ**. 2009. The effects of elevated carbon dioxide concentrations on the metamorphosis, size, and survival of larval hard clams (*Mercenaria mercenaria*), bay scallops (*Argopecten irradians*), and Eastern oysters (*Crassostrea virginica*). *Limnology and Oceanography* 54: 2072–2080

GRADUATE STUDENTS:

Former: Sarah Deonarine (MS, 2005), Patrick Curran (MS, 2006), Colleen Norman (MS, 2006), Michelle Weiss (MS, 2006), Jennifer Goleski (MS, 2008), Theresa Hattenrath (MS, 2009), Timothy Davis (PhD, 2009), Amanda Burson (MS, 2009), Matthew Harke (MS, 2009), Charles Wall (PhD, 2010), Xiaodong Jiang (PhD, 2010; co-advised with Darcy Lonsdale), Stephanie Talmage, (PhD, 2011), Florian Koch (PhD, 2012), Ryan Wallace (MS, 2012), Jennifer George (MS, 2012), Alex Mintz (MA, 2013), Elizabeth Depasquale (MS, 2014), Isabelle Stintte (MS, 2014), Theresa Hattenrath (PhD, 2014), Matthew Harke (PhD, 2015), Yoonja Kang (PhD, 2016), Andrew Griffith (PhD, 2018), Hannah Clark (MS, 2016), Lucas Merlo (MS, 2016), Jake Thickman (MS, 2016), Craig Young (MS, 2016), Alexandra Stevens (MS, 2017), Jennifer Jankowiak (MS, 2017); Jennifer Kim (MS, 2017);

Current: Ryan Wallace (PhD), Ben Kramer (PhD); Megan Ladds (PhD), Stephen Tomasetti (PhD), Peter Sylvers (PhD), Brooke Morrel (MS), Mark Lusty (MS), Timothy Curtin (MS), Rebecca Rodgers (MS)

POSTDOCTORAL FELLOWS AND RESEARCH ASSOCIATES:

Yingzhong Tang, 2006 –2013, Maria Alejandra Marcoval, 2008 – 2010, Dianna Berry, 2005 -2016, Florian Koch, 2012-2014, Theresa Hattenrath-Lehmann 2014-2017, Andrew Griffith 2018-, Stuart Waugh 2016-

Current and Pending Support:

C.J. Gobler

Current but terming before the start of this project

“Impacts of climate change and ocean acidification on economically important shellfish in New York: Are there effective mitigation and adaptation measures?”, NY Sea Grant, 2/1/16 – 1/31/18, \$240,000, PI: Gobler

Current and overlapping with the start of this project

“NYS Center for Clean Water Technology”, \$7,500,000; 9/1/15 – 8/31/20; Gobler co-PI, 2 months summer

“ECOHAB: Resolving the effects of resource availability, predation, and competition on brown tide dynamics via metatranscriptomics”, NOAA, 9/1/15 – 8/31/18, \$451,169, PI: Gobler, 1 month summer

“Southampton Coastal and Estuarine Research Program (SCERP)”, Renaissance Charitable Foundation Incorporated, \$1,259,250 8/31/12 – 12/31/18, 0 month summer.

“Assessing Harmful Algal and Pathogens in East Hampton Town Trustee waters”, East Hampton Town Trustees, \$49,500 4/4/16 – 4/3/17, 0 month summer.

“Shinnecock Bay Restoration Program”, Landeau Foundation, \$1,200,000, 7/1/17 – 6/30/20. PI: Gobler, 0 month summer.

“Assessing the biological effects of nitrogen loads on coastal resources”, Rauch Foundation, \$240,000, 5/1/17 - 4/30/120. PI: Gobler; 0 month summer.

PENDING

“ECOHAB:” NOAA, \$361,411, 9/1/18 - , 1 mo summer.

Education

1990: PhD in Electrical engineering, Polytechnic University of Twer, Twer, Russia

Research Interests:

Designer of different wireless and copperless (fiber optic) sensors and sensor based networks. There are sensors for industrial and special applications (includes submersible ones).

Lead a group of researchers and designers (4 Ph.D., 8 Grad. students and 12 undergraduates) during last 10 years as a part of Sensor CAT program.

Positions and Employment

Current *Head of the Opto-electronic Sensors and systems Lab. and Adjunct Professor*
State University of NY at Stony Brook

1994-1996: *Member of technical staff.*
Kassel's department of the "Bally Wulff GmbH" and the Department of Measurement Technologies, University of Kassel, Germany.

1993-1994: *Scientific Researcher,*
Department of Measurement Technologies, University of Kassel, Germany.

1990-1995: *Founder, Executive Director and Head of the "Measurement Systems" Laboratory, INCOLAB Ltd., Twer, Russia.*

1981-1993: *Senior Scientific Researcher and Project Supervisor.*
Laboratory of Measurement, Twer Technical University, Russia.

1978-1981: *Engineer.*
Laboratory of Telemetry, R&D Institute of Television Technology, Moscow, Russia.

Other Professional Activities

1990 *Founder, "INCOLAB Ltd.," Russia.*

2001 *Founder, "Ultimate Sensors, Inc.," NY.*

2005, 2007 *Member of NSF expert panel "SBIR Sensors"*

Awards and Honors

Bronze Medal at the Exhibition of the Achievements of the National Economy 1990. Moscow, Russia, "*Electro-optical tester of hardness for metal granules*"

Diploma IGRS 2008 for "Environmentally Powered Wireless Sensor Network System for Gas Pipelines" 2008 Paris, France.

Major publications(6 from 40 published)

1. S. Luryi, . M. Gouzman. Tellur Photo-Electrochemical Etching in the Process of Direct H₂ Generation by Illumination of GaN-Based Material Structures Immersed in Water. March 2017. Conference: 9th Workshop on Frontiers in Electronics 2015 (WOFE-15)
2. S. Luryi, . M. Gouzman. Reflections on the Future Electric Power Grid Monitoring System Conference International Journal of High Speed Electronics and Systems · February 2015 Frontiers in Electronics 2013 (Wofe-13)
3. Xiao Yun, Milutin Stanaćević, Vladis Kuzminsky and Mikhail Gouzman "Current-mode Preamplifier for Response Measurement of Semiconductor Scintillator", *IEEE International MWSCAS 2008 August 10-13*
4. S. Luryi and M. Gouzman, "Feasibility of an Optical Frequency Modulation System for Free-Space Optical Communications", invited paper to appear in *International Journal of High Speed Electronics* (2005);

5. M. Gouzman, N. Lifshitz, S. Luryi, O. Semyonov, D. Gavrilov, V. Kuzminskiy, "Excitation-emission fluorimeter based on linear interference filters", *Applied Optics* 43, pp. 3066-3072 (2004);
6. D.N.Gavrilov, B.Gorbovitski, M.Gouzman, G.Gudkov, A.Stepoukhovitch, V.Ruskovoloshin, A.Tsuprik, G.Tyshko, O.Bilenko, O.Kosobokova, S.Luryi, V.Gorfinkel, "Dynamic range of fluorescence detection and base-calling accuracy in DNA sequencer based on single-photon counting," *Electrophoresis*, Vol. 24, 1184-1192 (2003);

9,778,286	Sensors for power distribution network and electrical grid monitoring system associated therewith
9,222,830	Optical control sensor system with driver that switches frequencies of a set of different orthogonal signals and modulates the intensity of light
8,692,997	Optical gas and/or particulate sensors
6,944,407	Method and apparatus for detecting radiation
6,497,804	Method and apparatus for DNA sequencing
6,475,362	Method and apparatus for compression of DNA samples for DNA sequencing
6,464,852	Multicapillary bundle for electrophoresis and detection for DNA
6,038,023	Sensors for detection and spectroscopy

P.I. and co-P.I. in numbers of industrial research grants. There are more than \$500,000 had granted during last two years:

Completed Research Support

- US Department of Homeland Security co-P.I.;
- NSF co-P.I.;
- NYSTAR co-P.I.;
- Applied DNA Science, Inc. P.I.;
- SONOSTICS, Inc. P.I.;
- Green Energy Research. P.I.;
- Futurevision LLC P.I.;

Lead SUNY/BNL project “Sensors for underground and poll mounted sensor system for power distribution electrical grid”. Project started 2013, current funded \$450,000.

BIOGRAPHICAL SKETCH: J. Levinton

JEFFREY S. LEVINTON, Distinguished Professor

Department of Ecology and Evolution

State University of New York at Stony Brook

Stony Brook, New York 11794

Tel. No. 631-632-8602

EMAIL: Jeffrey.levinton@stonybrook.edu

a. Professional Preparation

Education. B.S., College of the City of New York, 1966 (Geology); N.S.F. Paleoecology Summer Course, Woods Hole, 1967; M. Phil., Yale University, 1969 (Geology and Geophysics); Ph.D., Yale University, 1971 (Geology and Geophysics)

Academic Honors. Ward Medal in Geology, College of the City of New York, 1966; Sterling Honorary Fellow, Yale University, 1969-1970; National Science Foundation Predoctoral Fellow, 1968-1970; John Simon Guggenheim Memorial Fellow, 1983-1984; President's and Chancellor's Award for Excellence in Teaching, 1997; Wiese Honorary Lecturer (Univ. of S. Alabama and Dauphin Island Marine Lab.) 1998, Laing Foundation Fellow (Univ. of Wales), 1998; Fulbright Senior Scholar, University of Sydney, 1999, Fellow AAAS 2000, Distinguished Professor of SUNY, 2004, National Academies Education Fellow in the Life Sciences 2013-2014

Current Editorial Boards, Journal Editorships, Committees. Member of Book Editorial Board of *Quarterly Review of Biology*, 1994-; Advancement Board, Friday Harbor Laboratories; Board of Directors, The River Project; Technical Advisory Board, The Harbor School, New York City.

b. Appointments

Fulbright Specialist 2012, Whiteley Visiting Scholar, 2007-2008, 2011, Fulbright Senior Scholar, University of Sydney, Australia, 4/99-9/99; Visiting Scholar, University of Washington, 9/90-6/91; Hudson River Fund Panel Chairperson, Hudson River Foundation, 2/86-6/90; Department Head, Department of Ecology and Evolution, S.U.N.Y. at Stony Brook, 9/84-8/90, 11/91-3/93; Visiting Investigator, Station Zoologique (Villefranche-Sur-Mer) and Laboratoire Arago (Banyuls-Sur-Mer), France, 1984; Visiting Professor, Department of Genetics and Kings College, University of Cambridge, 1983 (fall); Visiting Professor, Uppsala University, Sweden, 1981 (fall); Lecturer, Marine Ecology Course, Marine Biology Laboratory, Woods Hole, 1981, 1982, 1983 (summer); Professor, Ecology and Evolution, State University of New York at Stony Brook, 1983-present; Research Associate, Duke University Marine Laboratory, 1978 (summer); Visiting Professor, University of Aarhus, Denmark, 1976-1977; Associate Professor, Ecology and Evolution, State University of New York at Stony Brook, 1975-1983; Associate Professor, Paleoecology, State University of New York at Stony Brook, 1974-1975; Assistant Professor, Paleoecology, State University of New York at Stony Brook, 1971-1974; Instructor, Geology and Geophysics, State University of New York at Stony Brook, 1970-1971, Guest Student Investigator, Woods Hole Oceanographic Institution, 1969; Graduate Research Trainee, Systematics-Ecology Program, Marine Biological Laboratory, Woods Hole, 1969; Graduate Teaching Asst., Yale University, 1967-1969

c. Five Recent Relevant Publications

Levinton, J. 2016. Bilateral linkage of monomorphic and dimorphic limb sizes in fiddler crabs. *Biological Journal of the Linnean Society* 119: 370-380.

Levinton, J., Lord, S., Higeshide. 2015. Are crabs stressed for water on a hot sand flat? Water loss and field water state of two species of intertidal fiddler crabs. *J. Exp. Mar. Biol. Ecol.* 469: 57-62.

Allen, B.J., and J.S. Levinton. 2014. Sexual selection and the physiological consequences of habitat choice by a fiddler crab. *Oecologia* 176:25-34. DOI 10.1007/s00442-014-3002-y

Levinton, J.S., Mackie, J. 2013. Latitudinal diversity relationships of fiddler crabs: biogeographic differences united by temperature. *Global Ecology and Biogeography*. DOI: 10.1111/geb.12064

Munguia, P., Levinton, J.S., Silbiger, N.J. 2013. Latitudinal differences in thermoregulatory color change in *Uca pugnator*. *Journal of Experimental Marine Biology and Ecology* 440: 8-14.

d. 5 Other Publications of Interest

Cahill, A., Levinton, J.S. 2016. Genetic differentiation and reduced genetic diversity at the northern range edge of two species with different dispersal modes. *Molecular Ecology* 25: 515-526.

Levinton, J., Doall, M., Ralston, D., Starke A., Allam, B. 2011. Climate Change, precipitation and impacts on an estuarine refuge from disease. *PLoS ONE* 6(4): e18849. doi:10.1371/journal.pone.0018849

Mackie, J., Levinton, J.S., Przeslawski, R., DeLambert, D., Wallace, W. 2010. Loss of Evolutionary resistance by the oligochaete *Limnodrilus hoffmeisteri* to a toxic substance—cost or gene flow? *Evolution*, 64:152-165.

Allen, B., Levinton, J. 2007. Costs of bearing a sexually selected ornamental weapon in a fiddler crab. *Functional Ecology*, 21: 154-161.

Levinton, J. S., B. Allen. 2005. The paradox of the weakening combatant. Tradeoff between closing force and gripping speed in a sexually selected combat structure. *Functional Ecology* 19: 159-165.

d. Synergistic Activities

1. I have been developing web pages introducing marine biological diversity and ecology to the broad public, especially teenagers and college students. The Marine Biology Web Page has become a popular venue, including information on careers in marine biology, summer courses and internships. Since 2003 the career advice page has had over 1.4 million visits. <http://life.bio.sunysb.edu/marinebio/mbweb.html>, and translated into 9 languages.
2. I worked with the Hudson River Foundation to develop a broad-based volume in 2006 on the Hudson River Ecosystem, accessible to a broad range of managers and educators. It was published in Jan. 2006 by Cambridge Univ. Press.
3. I am on the Advisory Board of the Harbor School, a New York City High School specializing in Marine Studies with a large minority population. I have mentoring experience in conjunction with Hudson River Foundation summer support.
4. I have been working with Cathy Drew, Executive Director of the River Project, an organization devoted to research and educating children about the Hudson and the New York Harbor area. This involves interactions with an N.S.F. internship program.
5. I developed an on-line manual describing natural history, pollution and restoration of Foundry Cove, a Superfund site where I have worked for a number of years on rapid evolution. This manual is accessible to educators and was used in conjunction with a course on research that involved a class, which was divided into research teams. <http://life.bio.sunysb.edu/marinebio/foundrycove>
6. I was founding Director of Stony Brook University's Freshman College of Science and Society and still teach freshman seminars.
7. I have been engaged in training and design of innovative undergraduate courses. I was elected National Academies Teaching Fellow in 2014 and have been developing an innovative field team-based research course in restoration of aquatic environments. My course will be highlighted at the upcoming (8-17) NSF-cosponsored SENCER Summer Institute.

Current and Pending Support

(See PAPPG Section II.C.2.h for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.	
Investigator: Jeffrey Levinton	Other agencies (including NSF) to which this proposal has been/will be submitted:
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Collaborative Research: An Integrative Field and Biophysical Model of Thermal Stress, Physiological Performance, and Reproductive Fitness Source of Support: National Science Foundation Total Award Amount: \$ 353,793 Total Award Period Covered: 02/01/18 - 01/31/22 Location of Project: Ston Person-Months Per Year Committed to the Project. Cal: 0.00 Acad: 0.00 Sumr: 0.50	
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:	
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:	
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:	
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:	

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Education

1978: PhD in Physics, University of Toronto, Ontario, Canada

Research Interests:

Sensor systems, radiation detectors, optoelectronic devices, semiconductor physics

Professional experience:

Current Distinguished Professor of Electrical and Computer Engineering,
SUNY at Stony Brook, Stony Brook, NY 11794
Founding Director, Sensor CAT (NY State Center for Advanced Technology in
Sensor Systems)

1994-2016 Chair, ECE Department, SUNY at Stony Brook, Stony Brook, NY 11794-2350

1980-1994 Distinguished Member of the Technical Staff and Group Supervisor at Bell
Laboratories, Murray Hill, NJ.

Selected Other Professional Activities:

1995-present Founder and Director, International Workshop on the *Future Trends in
Microelectronics*, <http://www.ece.stonybrook.edu/~serge/FTM.html>

1986-1990 Associate Editor, then Editor-in-Chief, *IEEE Transactions on Electron Devices*

Awards and Honors:

2008: Fellow of the Optical Society of America with the citation: “*For outstanding and
pioneering contributions to semiconductor optoelectronics, especially to the physics and
photonic applications of low-dimensional semiconductor structures*”

2006: IEEE Papoulis Award for Excellence in Engineering and Technology Education
with the citation: “*For pioneering contributions to include entrepreneurial skills in
engineering education on Long Island*”

2003: Appointed to the rank of Distinguished Professor by the Board of Trustees of
State University of New York

2001: NYSTAR Distinguished Professor of 2001 with the citation “*In recognition of
academic excellence in the fields of electrical engineering and sensor technology*”.

1993: Fellow of the American Physical Society with the citation: “*For theory of electron
transport in low-dimensional systems and invention of novel electron devices*”

1990: Bell Laboratories award: *Distinguished Member of the Technical Staff*

1989: Fellow of the IEEE “*For contribution in the field of heterojunction devices*”

Publications and Patents:

Over 250 refereed journal papers, <http://www.ece.stonybrook.edu/~serge/papers.html>
54 US patents issued, <http://www.ece.stonybrook.edu/~serge/patents.html>
Hirsch index $h = 48$

Personal: Married, three children

Citizenship: Dual: U.S. and Canada

Current and Pending Support

Professor Serge Luryi, SUNY at Stony Brook
(As of November 2017)

Current Grants

Source:	NY State Science and Technology Foundation
Project title:	<i>Center for Advanced Technology in Sensor Systems</i>
Percent of effort:	25 % (PI, Founding Director)
Date and costs:	2009-2019 \$1M annually
Status:	<i>active</i>
Brief description:	The goal of this 10-year NY State center is to foster regional high-tech industrial development focusing on sensor technologies. See http://www.sensorcat.sunysb.edu/

Biographical Sketch

Janet A. Nye

Address: School of Marine and Atmospheric Sciences
Stony Brook University
Stony Brook, NY 11794

Telephone: (631)-632-3187

E-Mail: janet.nye@stonybrook.edu

Citizenship: United States

(a) Professional Preparation

Duke University	Biology	B.S.	1996
U. of Delaware	Marine Biology & Biochemistry	M.S.	2002
U. of Maryland	Marine, Estuarine & Environmental Science	Ph.D.	2008

(b) Appointments

2018—present	Associate Professor , School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, NY
2012—2018	Assistant Professor , School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, NY
2017-present	Affiliated Faculty , Institute for Advanced Computational Science, Stony Brook University, Stony Brook, NY
2015-present	Adjunct Faculty , Department of Ecology and Evolution, Stony Brook University, Stony Brook, NY
2010—2012	Research Ecologist , Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI
2008—2010	Research Associate , NOAA National Marine Fisheries Service Northeast Fisheries Science Center, Woods Hole, MA

(c) Products

ii. Five products most closely related to the proposed project

1. Baumann, H., and **J. Nye** (2016). Laboratory study of long-term growth in juvenile *Menidia menidia* (Atlantic silverside) at contrasting CO₂ levels for 16 to 122 days in 2015. Biological and Chemical Oceanography Data Management Office (BCO-DMO). <http://www.bco-dmo.org/dataset/651461/data>

Henderson, ME, A Thomas, K Mills, A Pershing and **JA Nye** (2017). Effects of spring onset and summer duration on fish species distribution and biomass along the Northeast United States Continental Shelf *Reviews in Fish Biology and Fisheries* 27: 411-424.

Thomas, A, A Pershing, KD Friedland, **JA Nye**, KE Mills, MA Alexander, NR Record, R Weatherbee, ME Henderson (2017). Seasonal trends in phenology shifts in sea surface temperature on the North American northeast shelf. *Elementa: Science of the Anthropocene*

Pershing, A. J., MA Alexander, CM Hernandez, LA Kerr, A Le Bris, KE Mills, **JA Nye**, NR Record, HA Scannell, JD Scott, GD Sherwood, AC Thomas (2015). Slow adaptation in the face of rapid warming leads to the collapse of an iconic fishery. *Science* 350 (6262): 809-812.

Nye, JA, R Gamble, and JS Link. (2013). Relative impact of warming and removing top predators on the Northeast US large marine ecosystem. *Ecological Modelling* 264: 157-168.

iii. Five other significant products

Nye, J.A., J.S. Link, J.A. Hare, and W.J. Overholtz. (2009). Changing spatial distribution of fish stocks in relation to climate and population size on the Northeast US continental shelf. *Marine Ecology Progress Series* 393:111-129.

Nye, J.A. T.M. Joyce, Y. Kwon, and J.S. Link. (2011). Silver hake tracks changes in Northwest Atlantic circulation. *Nature Communications* 2: 412 doi: 10.1038/ncomms1420

Mills K, A Pershing, C Brown, Y Chen, F Chiang, D Holland, S Lehuta, **JA Nye**, J Sun, A Thomas. (2013). Fisheries management in a changing climate: Lessons from the 2012 ocean heat wave in the Northwest Atlantic. *Oceanography* 26(2): 191-195.

Lucey, S. and **J.A. Nye**. (2010). Changes in community structure within the Northeast US continental shelf ecosystem. *Marine Ecology Progress Series* 415: 23-33.

Morse, RE*, K Friedland, D Tommasi, C Stock, **JA Nye** (2017). Distinct zooplankton regime shift patterns across ecoregions of the U.S. Northeast continental shelf Large Marine Ecosystem. *Journal of Marine Systems* 165: 77-91.

(d) Synergistic Activities

I am actively involved with Mid-Atlantic Coastal Acidification Network (MACAN) as the PI of a project funded by New York Department of Environmental Conservation to monitor carbonate chemistry and other ocean indicators for the next ten years. For MACAN, I served on a committee that developed a white paper entitled “Scientific Considerations for Acidification Monitoring in the U.S. Mid-Atlantic Region”

I am on the advisory council and teach a mini course for Stony Brook Women in Science and Engineering (WISE) Honors program and am a founding member of Women in GeoSciences (WINGS) that seeks to increase the involvement of women in science careers at the high school, college and graduate levels.

I am a member of several scientific organizations including Graduate Women in Science (GWIS) where I served on the fellowship committee and helped coordinate proposal reviews for three years. I am also involved in public outreach having given presentations to students and the public on climate change issues on numerous occasions.

I have reviewed proposals for the NSF, North Pacific Research Board, NOAA FATE and numerous State SeaGrant organizations and am a manuscript reviewer for numerous journals including *Science*, *Marine Ecology Progress Series*, *Progress in Oceanography*, *Global Change Biology*, *Ecological Applications*, *Fisheries Oceanography*, *Journal of Fish Biology*, *PLOS One*, *Marine and Coastal Fisheries*, *Estuaries and Coasts*, *Transactions of American Fisheries Society*, *North American Journal of Fisheries Management*, and Chesapeake Research Consortium.

I currently serve on the board for the Regional Association for Research on the Gulf of Marine (RARGOM) and previously served on the Board of Directors for the Southern New England Chapter of the American Fisheries Society.

Current and Pending support-Janet Nye

Current Support

New York Department of Conservation “Development and implementation of an ocean ecosystem monitoring program for New York Bight” (1 person month/yr, \$11,000,000, 9/1/2017-8/31/2027)

NOAA MAPP “Probabilistic seasonal prediction of the distribution of fish and marine mammals in the Northeast US” (1 week/yr, \$496,000, 9/1/2017-8/31/2020)

NOAA MAPP “Development and evaluation of a seasonal-to-interannual statistical forecasting system for oceanographic conditions and living marine resources on the Northeast U.S. Shelf” (2 weeks/yr, \$509,573, 9/1/2017-8/31/2020)

NSF Research Traineeship NRT-DESE (DGE-1633299) “Science Training and Research to Inform DEcisions (STRIDE)” (2 weeks in 2018 and 2019, \$2,993,930, 9/1/16-8/31/2021)

NSF Biological Oceanography (OCE-1536336) “Collaborative Research: Understanding the effects of acidification and hypoxia within and across generations in coastal marine fish” (1 person month/yr, \$118,219 12/1/2015-11/30/2019)

Pending

NSF “Collaborative Research: Understanding the impact of warming on the structure and function of marine communities” (2 person months in Year 1, 1 person month in Year 2-3, \$310,561, 2/15/19-2/14/22)

Bradley James Peterson

School of Marine and Atmospheric Sciences, Stony Brook University
239 Montauk Hwy, Southampton, NY 11968

Phone: (631) 632-5044; FAX: (631) 632-5070; email: bradley.peterson@stonybrook.edu

Professional preparation

Florida Institute of Technology	Marine Biology	B.S., 1985-1989
University of Rhode Island	Zoology	M.S., 1990-1993
Dauphin Island Sea Lab	Marine Ecology	Ph.D., 1993-1998
Florida International University	Marine Ecology	Postdoc, 1999-2000

Appointments

Associate Professor	Stony Brook University	2011- <i>present</i>
Assistant Professor	Stony Brook University	2005-2010
Assistant Professor	Southampton College	2002-2005
Research Scientist	Florida International University	2000-2002

Five publications most relevant to proposed research

Stubler, A. D. and **B. J. Peterson**. 2016. Ocean acidification accelerates dissolution and bioerosion in a coral rubble community. *Coral Reefs* 35(2): 795-803.

Stubler, A. D., B. T. Furman and **B. J. Peterson**. 2015. Sponge erosion under acidification and warming scenarios: differential impacts on living and dead coral. *Global Change Biology* 21(11): 4006-4020.

Stubler, A. M., B. T. Furman and **B. J. Peterson**. 2014. Effects of $p\text{CO}_2$ on the interaction between an excavating sponge, *Cliona varians*, and a hermatypic coral, *Porites furcata*. *Marine Biology* 161: 1851-1859.

Duckworth, A. R. and **B. J. Peterson**. 2013. Effects of seawater temperature and pH on the boring rates of the sponge *Cliona celata* in scallop shells. *Marine Biology* 160: 27-35.

Furman, B. T., L. J. Jackson, E. Bricker and **B. J. Peterson**. 2015. Sexual recruitment in *Zostera marina*: a patch to landscape-scale investigation. *Limnology and Oceanography* 60(2): 584-599.

Five other publications

Tettelbach, S. T., **B. J. Peterson**, J. M. Carroll, B. T. Furman, S. W. T. Hughes, J. Havelin, J. R. Europe, D. M. Bonal, A. J. Weinstock and C. F. Smith. 2015. Aspiring to an Alternative Stable State: Rebuilding of Bay Scallop Populations and Fisheries Following Intensive Restoration. *Marine Ecology Progress Series* 529: 121-136.

Peterson, B. J., E. Bricker, S. J. Brisbin, B. T. Furman, A. D. Stubler, J. M. Carroll, D. L. Berry, C. J. Gobler, A. Calladine, M. Waycott. 2013. Genetic diversity and gene flow in *Zostera marina* populations surrounding Long Island, New York, USA: No evidence of inbreeding, genetic degradation or population isolation. *Aquatic Botany* 110: 61-66.

Wall, C. C., **B. J. Peterson**, E. Ward and C. J. Gobler. 2013. Contrasting growth patterns of suspension-feeding molluscs (*Mercenaria mercenaria*, *Crassostrea virginica*, *Argopecten irradians* and *Crepidula fornicata*) across a eutrophication gradient in the Peconic Estuary, NY,

USA. *Estuaries and Coasts* 36:1274-1291.

Neckles, H., B. Kopp, **B. J. Peterson** and P. Pooler. 2012. Integrating scales of seagrass monitoring to meet conservation needs. *Estuaries and Coasts* 35: 23-46.

Carroll, J., C. J. Gobler and **B. J. Peterson**. 2008. Resource- restricted growth of eelgrass in New York estuaries: light limitation, and alleviation of nutrient stress by hard clams. *Marine Ecology Progress Series* 369:51-62.

Synergistic activities

Synthetic activities

I have been a member of multiple working groups focused on (1) the effects of climate change on coastal marine communities (sponsored by NPS) and (2) the impacts of multiple stressors on seagrass communities (sponsored by the State of New York and ACOE)

Teaching and Training

To date, I have advised 1 postdoctoral scholar, 17 graduate students, 58 undergraduates, and 7 high school students; of the undergraduates, 28 are either enrolled or pursuing graduate school in ecological sciences. I have also taught undergraduate courses in Marine Ecology, Field Biology, Experimental Marine Biology, Coastal Oceanography, Tropical Marine Ecology, Aquaculture, Biometry, Marine Conservation and graduate courses in Benthic Ecology and Seagrass Community Ecology

International Education Programs

Visiting Scholar, Discovery Bay Marine Lab, Jan 2006-present

Broadening participation of under-represented groups

I am involved with numerous activities aimed at promoting both gender and ethnic diversity in science, including the Women in Math, Science and Engineering group at SB and local activities aimed at fostering the participation of middle school and high school students of the Shinnecock Indian nation in the sciences.

Collaborators in the last 48 months

Eric Bricker (University of Virginia), Jackie Collier (Stony Brook), Alan Duckworth (Australian Institute of Marine Science), Christopher Gobler (Stony Brook), Ken Heck (Dauphin Island Sea Lab), Ioannis Karakassis (Hellenic Center of Marine Research), Hilary Neckles (USGS), Stephen Tettelbach (Long Island University), John Valentine (Dauphin Island Sea Lab), Michelle Waycott (James Cook University), Jay Zieman (University of Virginia)

Graduate Advisor and Postdoctoral Sponsor

Ken Heck, Dauphin Island Sea Lab (graduate advisor)

James Fourqurean, Florida International University (postdoctoral sponsor)

Mentored Graduate Students

Allyson Lowell (Ph.D. *current*), Stephen Heck (Ph.D. *current*), Diana Chin (Ph.D. *current*), Rebecca Kulp (Ph.D. *current*), Kaitlyn O'Toole (M.S. *current*), Amanda Tinoco (M.S. *current*), Amber M. Stubler (Ph.D. 2015), Brad Furman (Ph.D. 2015), Elizabeth Gomez (M.S. 2015), Lisa Jackson (M.S. 2014), John M. Carroll (Ph.D. 2012), Charles C. Wall (Ph.D. 2010), Brooke S. Rodgers (M.S. 2010), Sterling Brisbin (M.S. 2010), Konstantine Rountos (M.S. 2008), Alexa Fourier (M.S. 2007)

Investigator: Bradley J. Peterson Associate Professor	Other agencies (including NSF) to which this proposal has been/will be submitted. Stony Brook University School of Marine and Atmospheric Sciences		
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Monitoring Estuarine Condition and Seagrass in NPS Northeast Coastal Barrier Network Parks Source of Support: NPS Total Award Amount: \$5,080 Total Award Period Covered: 03/29/2016 – 06/30/2017 Location of Project: Fire Island National Seashore, Great South Bay, NY Person-Months Per Year Committed to the Project. Cal: Acad: 0.5 Sumr:			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Water Quality Improvement Program: Shinnecock Bay Restoration Project Source of Support: NYS DEC Total Award Amount: \$505,658 Total Award Period Covered: 05/01/2016 – 04/30/2020 Location of Project: Shinnecock Bay, NY Person-Months Per Year Committed to the Project. Cal: Acad: Sumr: 1.0			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Water Quality Improvement Program: Great South Bay Shellfish Bed Project Source of Support: NYS DEC Total Award Amount: \$241,396 Total Award Period Covered: 01/05/2016 – 04/30/2019 Location of Project: Great South Bay, NY Person-Months Per Year Committed to the Project. Cal: Acad: Sumr: 0.5			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Environmental Quality/Peconic Estuary Seagrass Assessment Services Source of Support: Suffolk County Health Services Total Award Amount: \$68,080 Total Award Period Covered: 05/01/2016-04/30/2018 Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:			
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Monitoring Estuarine Condition and Seagrass in Fire Island National Seashore Source of Support: NPS Total Award Amount: \$32,547 Total Award Period Covered: 06/01/2017 – 5/30/2018 Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr: 1.0			

Investigator: Bradley J. Peterson Associate Professor	Stony Brook University School of Marine and Atmospheric Sciences		
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Creating a bio-optical model for Great South Bay Source of Support: NY DEC Total Award Amount: \$42,000 Total Award Period Covered: 05/01/2016 – 04/30/2018 Location of Project: Great South Bay, NY Person-Months Per Year Committed to the Project. Cal: Acad: 0.5 Sumr:			
Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Seagrass experiments and field testing for utilizing seeds to restore stock limited areas in Great South Bay Source of Support: The Nature Conservancy Total Award Amount: \$40,000 Total Award Period Covered: 07/01/2017 – 06/30/2019 Location of Project: Shinnecock Bay, NY Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:			

ROBERT W. THACKER

ADDRESS

Stony Brook University
Department of Ecology and Evolution
650 Life Sciences Building
Stony Brook, NY 11794-5245

631-632-8600
robert.thacker@stonybrook.edu

PROFESSIONAL PREPARATION

Duke University	Durham, NC	Zoology	B.S. 1990
University of Michigan	Ann Arbor, MI	Biology	M.S. 1992
University of Michigan	Ann Arbor, MI	Biology	Ph.D. 1995
University of Guam	Mangilao, GU	Marine Ecology	1995-1996
University of Hawaii	Honolulu, HI	Molecular Systematics	1996-1998
University of Guam	Mangilao, GU	Marine Ecology	1998-2000

APPOINTMENTS

2015 – present	Professor and Chair, Department of Ecology and Evolution, Stony Brook University
2012 – 2015	Professor, Department of Biology, Univ. of Alabama at Birmingham
2012 – 2013	Interim Chair, Department of Biology, Univ. of Alabama at Birmingham
2006 – 2012	Associate Professor, Department of Biology, Univ. of Alabama at Birmingham
2000 – 2006	Assistant Professor, Department of Biology, Univ. of Alabama at Birmingham

FIVE PRODUCTS CLOSELY RELATED TO THE PROPOSED PROJECT

1. Freeman, CJ, Baker DM, Easson CG, **Thacker RW**. 2015. Shifts in sponge-microbe mutualisms across an experimental irradiance gradient. *Marine Ecology Progress Series* 526:41-53. DOI: 10.3354/meps11249.
2. Easson CG, Matterson KO, Freeman CJ, Archer SK, Thacker RW. 2015. Variation in species diversity and functional traits of sponge communities near human populations in Bocas del Toro, Panama. *PeerJ* 3:e1385. doi: 10.7717/peerj.1385.
3. Diaz MC, **Thacker RW**, Redmond NE, Perez T, Collins AG. 2015. *Vansoestia caribensis* gen. nov., sp. nov.: first report of the family Ianthellidae (Verongida, Demospongiae) in the Caribbean. *Zootaxa* 3956(3): 403-412. DOI: 10.11646/zootaxa.3956.3.5.
4. **Thacker RW**, Diaz MC, Kerner A, Vignes-Lebbe R, Segerdell E, Haendel MA, Mungall CJ. 2014. The Porifera Ontology (PORO): enhancing sponge systematics with an anatomy ontology. *Journal of Biomedical Semantics* 5: 39. DOI: 10.1186/2041-1480-5-39.
5. **Thacker RW**, Hill AL, Hill MS, Redmond NE, Collins AG, Morrow CC, Spicer L, Carmack CA, Zappe ME, Pohlmann D, Hall C, Diaz MC, Bangalore PV. 2013. Nearly complete 28S rRNA gene sequences confirm new hypotheses of sponge evolution. *Integrative and Comparative Biology* 53(3): 373-387. DOI: 10.1093/icb/ict071.

FIVE OTHER SIGNIFICANT PRODUCTS

1. Thomas T, Moitinho-Silva L, Lurgi M, Björk JR, Easson C, Astudillo-Garcia C, Olson JB, Erwin PM, Lopez-Legentil S, Luter H, Chaves-Fonnegra A, Costa R, Schupp PJ, Steindler L, Erpenbeck D, Gilbert J, Knight R, Ackermann G, Lopez JV, Taylor MW, **Thacker RW**, Montoya JM, Hentschel U, Webster NS. 2016. Diversity, structure and convergent evolution of the global sponge microbiome. *Nature Communications* 7: 11870. DOI: 10.1038/ncomms11870.
2. Easson CG, **Thacker RW**. 2014. Phylogenetic signal in the community structure of host-specific microbiomes of tropical marine sponges. *Frontiers in Microbiology* 5: 532. DOI: 10.3389/fmicb.2014.00532.
3. Olson JB, **Thacker RW**, Gochfeld DJ. 2014. Molecular community profiling reveals impacts of time, space, and disease status on the bacterial community associated with the Caribbean sponge *Aplysina cauliformis*. *FEMS Microbiology Ecology* 87(1): 268-279. DOI: 10.1111/1574-6941.12222.
4. Morrow CC, Redmond NE, Picton BE, **Thacker RW**, Collins AG, Maggs CA, Sigwart JD, Allcock AL. 2013. Molecular phylogenies support homoplasy of multiple morphological characters used in the taxonomy of Heteroscleromorpha (Porifera: Demospongiae). *Integrative and Comparative Biology* 53(3): 428-446. DOI: 10.1093/icb/ict065.
5. Redmond NE, Morrow CC, **Thacker RW**, Diaz MC, Boury-Esnault N, Cardenas P, Hajdu E, Lobo-Hajdu G, Picton BE, Pomponi SA, Kayal E, Collins AG. 2013. Phylogeny and systematics of Demospongiae in light of new small-subunit ribosomal DNA (18S) Sequences. *Integrative and Comparative Biology* 53(3): 388-415. DOI: 10.1093/icb/ict078.

FIVE SYNERGISTIC ACTIVITIES

1. Editor, *Invertebrate Biology*, 2008 – present.
2. Editorial Board, *Integrative and Comparative Biology*, 2010 – 2015.
3. Program Officer, American Microscopical Society, 2012 – 2015.
4. Dean's Award for Excellence in Mentorship, 2008. Since 2000, I have mentored 63 students in laboratory and field research, including 31 women and 14 under-represented minorities.
5. Instructor and Organizer, field course on "Taxonomy and Ecology of Caribbean Sponges" held at the Smithsonian Tropical Research Institute's Bocas Research Station, Bocas del Toro, Panama, August 2005, July 2006, August 2007, August 2010, August 2012, July 2016.

Current and Pending Support

(See PAPPG Section II.C.2.h for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.			
Investigator: Robert Thacker	Other agencies (including NSF) to which this proposal has been/will be submitted.		
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Collaborative Research: ARTS: Integrative Research and Training in Tropical Taxonomy Source of Support: NSF Div of Environmental Biology, Systematic Biology Program Total Award Amount: \$ 73,406 Total Award Period Covered: 01/01/15 - 03/31/19 Location of Project: Stony Brook University Person-Months Per Year Committed to the Project. Cal:0.00 Acad: 0.00 Sumr: 0.50			
Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Collaborative Research: Investigations into microbially mediated ecological diversification in sponges Source of Support: NSF Div of Ocean Sciences, Biological Oceanography Program Total Award Amount: \$ 101,713 Total Award Period Covered: 08/01/18 - 07/31/21 Location of Project: Stony Brook University Person-Months Per Year Committed to the Project. Cal:0.00 Acad: 0.00 Sumr: 0.50			
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:			
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:			
Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support Project/Proposal Title: Source of Support: Total Award Amount: \$ Total Award Period Covered: Location of Project: Person-Months Per Year Committed to the Project. Cal: Acad: Summ:			

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

BIOGRAPHICAL SKETCH

Nils VOLKENBORN

School of Marine and Atmospheric Sciences
Stony Brook University
Stony Brook, NY 11794-5000
Tel: (631) 632-6133
Email: nils.volkenborn@stonybrook.edu

(a) Professional Preparation

University of Aachen, Germany Biology Vordiplom, 1996
University of Oldenburg, Germany Biology Diplom, 2001
University of Bremen and Max Planck Institute for Marine Microbiology Germany Biology Dr. rer. nat., 2005

(b) Appointments

Assistant Professor, School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University (2014-present).
Assistant Professor, Graduate Program in Ecology and Evolution, Stony Brook University (2017-present).
Research Scientist, Department for Coastal Environment Dynamics, Institut Français de Recherche pour l'Exploitation de la Mer (Ifremer), France (2013-2014).
Post-Doctoral Fellow, Department of Biological Sciences, University of South Carolina, USA (2008-2013).
Post-Doctoral Fellow, Wadden Sea Station Sylt, Alfred Wegener Institute for Polar and Marine Research, Germany (2006-2008).

(c) Publications

Related Publications

Snelgrove P.V.R., Soetaert K., Solan M., Thrush S.F., Wei C.-L., Danovaro R., Fulweiler R.W., Hiroshi K., Ingole B., Norkko A., Parkes R.J., **Volkenborn N.** (2017) Global Carbon Cycling on a Heterogeneous Seafloor. (accepted, Trends in Ecology & Evolution)
Chappon C., **Volkenborn N.**, Clavier J., Séité S., Seabra R., Lima F.P. (2016) Exposure to solar radiation drives organismal vulnerability to climate: evidence from an intertidal limpet. *Journal of Thermal Biology* 57: 92-100.
Pascal L., Maire O., **Volkenborn N.**, Lecroart P., Bichon S., de Montaudouin X., Grémare A., Deflandre B. (2016) Influence of the mud shrimp *Upogebia pusilla* (Decapoda: Gebiidea) on solute and porewater exchanges in an intertidal seagrass (*Zostera noltei*) meadow of Arcachon Bay: An experimental assessment. *Journal of Experimental Marine Biology and Ecology* 477: 69-79.
Wetzel D. S., S. A. Woodin, **N. Volkenborn**, and K. Reise. (2008) Pore-water advection by hydraulic activities of lugworms, *Arenicola marina*: A field, laboratory and modeling study. *Journal of Marine Research* 66: 255-273.

Volkenborn N., L. Polerecky, S. I. C. Hedtkamp, J. E. E. van Beusekom, and D. De Beer. (2007) Bioturbation and bioirrigation extend the open exchange regions in permeable sediments. *Limnology and Oceanography* 52: 1898-1909.

Other Significant Publications

Volkenborn N., Woodin S.A., Wethey D.S., Polerecky L. (2016) Bioirrigation in marine sediments. Reference Module in Earth Systems and Environmental Sciences. DOI: 10.1016/B978-0-12-409548-9.09525-7.

Woodin S.A., **Volkenborn N.,** Pilditch C.A., Lohrer A.M., Wethey D.S., Hewitt J., Thrush S.F. (2016) Same pattern, different mechanism: Locking onto the role of key species in seafloor ecosystem process. *Scientific Reports* 6: 26678.

Chennu A., N. **Volkenborn, D.** de Beer, D.S Wethey, S.A. Woodin, L. Polerecky (2015) Effects of bioadvection by *Arenicola marina* on microphytobenthos in permeable sediments. *PlosOne* 10 (7): e0134236. doi:10.1371/journal.pone.0134236.

Volkenborn N., C. Meile, L. Polerecky, D. S. Wethey, S. A. Woodin, C. Pilditch, A. Norkko, J. Norkko, J. E. Hewitt, and S. F. Thrush. (2012) Intermittent bioirrigation and oxygen dynamics in permeable sediments: An experimental and modeling study of three tellinid bivalves. *Journal of Marine Research* 70: 794-823.

Volkenborn N., L. Polerecky, D. S. Wethey, T. H. DeWitt, and S. A Woodin. (2012) Hydraulic activities by ghost shrimp *Neotrypaea californiensis* induce oxic-anoxic oscillations in sediments. *Marine Ecology Progress Series* 455: 141-156.

d) Synergistic Activities

Invited workshop participant: The Ocean's Seafloor – One Bio-Geo-System, Volkswagen Stiftung Symposium, 10/10/16-10/12/16, Hanover, Germany; SCOR Workshop on Seafloor Ecosystem Functions and their Role in Global Processes 9/16/15-9/18/15, Naples, Italy; iMUDS workshop on Bioturbation and Paleoclimatology 6/16/17-6/19/17, Lake Arrowhead, California

Creation of video clips to inform the non-scientific community about research on the seafloor, e.g., “The burrowing Shrimp” as contribution to the Ocean 180 Video Challenge 2015, (COSEE Florida); “The Sound of the Seafloor” as contribution to the Beneath the Waves Film Festival, (streamed at the Benthic Ecology Meeting 2016, Portland, Maine).

Participation in Outreach through hands-on demonstrations, e.g., New York Marine Science Festival “Submerge” 2016 and 2017: “Hypoxia: Not for the Faint of Heart”; “Meet with an Oceanographer” at the Long Island Aquarium: “Buried Alive-The Secret Life of Animals in the Seafloor” 7/16/16.

Webinar and interactive map in conjunction with the Centers for Ocean Sciences and Education Excellence (COSEE) - Ocean Systems: Beneath the surface: How do burrowing organisms affect the functioning of benthic ecosystems (2012).

Development of a Benthic Ecology Module for the Science Lab program at the University of South Carolina (led by Dr. Bert Ely, Director of the Center for Science Education, and funded by NIH). This module gave historically underrepresented and economically disadvantaged middle school students hands on experience in sampling of benthic organisms and using time-lapse photography to study the behavior of burrowing organisms (2012).

Current & Pending Support

N. VOLKENBORN

Current Grants

1. Support for Conference: Biological modification of the seabed and sediment-water interactions
PI: R.C. Aller
Co-PI(s): J. Y. Aller, N. Volkenborn, Q.Z. Zhu
Source: NSF-OCE
Award: \$ 10,000 for 6/1/17 to 5/31/2018
Location: Stony Brook University
Commitment: 0 summer month per year

Pending Grants

1. Contrasting Nitrogen and Carbon Transformations in Nitrogen Removing Biofilters (NRBs) for Onsite Wastewater Treatment
PI: X. Mao
Co-PI(s): J. Collier, N. Volkenborn,
Source: NSF-CBET
Award: \$ 327,927
Location: Stony Brook University
Commitment: 0.25 summer month per year

2. Iron cycling in bioturbated sediments - Fluxes, diagenetic redistribution, and isotopic signatures
PI: L. Wehrmann
Co-PI(s): N. Volkenborn, R.C. Aller
Source: NSF-OCE
Award: \$ 574,845
Location: Stony Brook University
Commitment: 1 summer month per year

BIOGRAPHICAL SKETCH

Qingzhi Zhu

School of Marine and Atmospheric Sciences
Stony Brook University, Stony Brook, NY 11794-5000
Email: qing.zhu@stonybrook.edu
Tel: (631) 632-8747

(a) Professional Preparation:

Lanzhou University, Lanzhou, China Department of Chemistry, B.S. 1991
Lanzhou University, Lanzhou, China Department of Chemistry, M.S. 1994
Xiamen University, Xiamen, China Department of Chemistry, Ph.D. 1997
Technical University of Munich, Munich, Germany Postdoctoral Associate Environmental chemistry, 2000 – 2002
Stony Brook University, Stony Brook, NY Postdoctoral Associate Marine chemistry, 2002 – 2005

(b) Appointments:

Associate Professor, School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University (2014 - present).
Assistant Professor, SoMAS, Stony Brook University (2008 - 14).
Adjunct Associate Professor, SoMAS, Stony Brook University (2005 – 2008).
Research Scientist, SoMAS, Stony Brook University (2005 – 2008).
Postdoctoral Research Associate, SoMAS, Stony Brook University (2004 – 2005).
Camille and Henry Dreyfus Foundation Fellow, SoMAS, Stony Brook University (2002 – 2004).
Alexander von Humboldt Foundation Fellow, Institute of hydrochemistry, Technical University of Munich, Germany (2000 – 2002).
Associate Professor, Department of Chemistry, Xiamen University, China (1999 – 2003).
Assistant Professor, Department of Chemistry, Xiamen University, China (1997 – 1999).

(c) Products:

Most closely related to the proposed project:

- H. Yin, Q.Z. Zhu, R.C. Aller. An irreversible planar optical sensor for multi-dimensional measurements of sedimentary H₂S. *Mar. Chem.* 2017, 195: 143-153.
- Q.Z. Zhu and R.C. Aller. Planar fluorescence sensors for two-dimensional measurements of H₂S distributions and dynamics in sedimentary deposits. *Mar. Chem.*, 2013, 157: 49-58.
- Q.Z. Zhu and R.C. Aller. A rapid response, planar fluorosensor for measuring twodimensional pCO₂ distributions and dynamics in marine sediments. *Limnol. Oceanogra.: Methods*, 2010, 8:326-336.
- Y.Z. Fan, Q.Z. Zhu, R.C. Aller, D.C. Rhoads. An *in situ* multispectral imaging system for planar optodes in sediments: example high resolution seasonal patterns of pH. *Aquatic Geochem.*, 2011, 17:457-471.
- Q.Z. Zhu, R.C. Aller, and Y. Fan. Two dimensional pH distributions and dynamics in bioturbated marine sediments. *Geochim. Cosmochim. Acta*, 2006, 70:4933-3939.

Other significant products:

- H. Feng, Y. Qian, J. K. Cochran, Q.Z. Zhu, W. Hu, H. Yan, L. Li, X. Huang, Y.S. Chu, H. Liu, S. Yoo, C.J. Liu. Nanoscale measurement of trace element distributions in *Spartina alterniflora* root tissue during dormancy. Science Reports. 2017, 7:40420 | DOI: 10.1038/srep40420.
- Z. Cao, Q.Z. Zhu, R.C. Aller, J.Y. Aller, and S. Waugh, Seasonal, 2-D sedimentary extracellular enzyme activities and controlling processes in Great Peconic Bay, Long Island. J. Mar. Res., 2013, 71:399-423.
- Z. Cao, Q.Z. Zhu, R.C. Aller, J.Y. Aller. A fluorosensor for two-dimensional in situ extracellular enzyme activity measurements in marine sediments. Mar. Chem., 2011, 123:23-31.
- Q.Z. Zhu and R.C. Aller. Two-dimensional dissolved ferrous iron distributions in marine sediments as revealed by a novel planar optical sensor. Mar. Chem., 2012, 136-137: 14-23.
- Q.Z., Zhu, R.C. Aller, Y. Fan. A new ratiometric, planar fluorosensor for measuring high resolution, two-dimensional $p\text{CO}_2$ distributions in marine sediments. Mar. Chem., 2006, 101, 40-53.

(d) Synergistic Activities

1. *Innovations in teaching and training*: design and development of new courses and laboratory experiments and corresponding curricular materials for Stony Brook undergraduate and graduate students.
2. *Facilitating research opportunities for a diverse undergraduate student population*: Research mentor and laboratory supervisor for Stony Brook undergraduates; NSF REU program research mentor.
3. *Service to the scientific and engineering community*: Serve as reviewer for multiple peer-reviewed scientific journals; Reviewer of proposals for NSF, NOAA; Sea Grant panel member.
4. General public/community science lectures.

Current & Pending Support

QINGZHI ZHU

Current Grants

1. Title: Ultra-sensitive and specific graphene immunosensors for in-situ measurement of mercury in marine ecosystems
PI: Qingzhi Zhu
Co-PI: X. Du, R.C. Aller
Source: NSF-OCE-OTIC, EAGER program (OCE-1630195)
Award: \$136,968
Duration: 07/01/2016 – 06/30/2018
Location: Stony Brook University
Commitment: 1 month summer.
2. Coupling of carbonate cycling and redox reactions in the bioturbated zone of marine sediments
PI: Robert C. Aller
Co-PI: J.Y. Aller, Q.Z. Zhu
Source: NSF-OCE (OCE-1737749)
Award: \$863,043
Duration: 08/15/2017 – 07/31/2020
Location: Stony Brook University
Commitment: 1 month summer per year
3. Title: Coastal resiliency via integrated wetland management sample collection and analysis
PI: J. Kirk Cochran
Co-PI: Qingzhi Zhu
Source of support: Suffolk county Department of Economic Development
Total award amount: \$85,000
Duration: 05/01/2016 – 04/20/2018
Location: Stony Brook University
Commitment: two week summer
4. Support for Conference: Biological modification of the seabed and sediment-water interactions
PI: Robert C. Aller
Co-PI(s): J. Y. Aller, N. Volkenborn, Q.Z. Zhu
Source: NSF-OCE
Budget: \$ 10,000 for 6/1/17 to 5/31/2018
Location: Stony Brook University
Commitment: 0 summer month per year

Pending Grants