Stony Brook University

SoMAS
School of Marine and Atmospheric Sciences

Biannual Report 2010 — 2011

Dear Friend….

Dr. Minghua Zhang, Dean and Director

The School of Marine and Atmospheric Sciences (SoMAS) at Stony Brook University is an interdisciplinary center for education, research and public service. Our mission is to increase fundamental understanding, through research and education, of the oceans and atmosphere, their interactions, and the life systems they support. We also develop and communicate innovative solutions to environmental problems at local, regional, national and global levels.

The origins of SoMAS date to 1965, when the State University of New York Board of Trustees established the Marine Sciences Research Center (MSRC) at the new campus at Stony Brook. The Center's focus broadened in 1992 to include the atmosphere and ocean-atmosphere interactions when the Institute for Terrestrial and Planetary Atmospheres (ITPA) was incorporated into MSRC. The Center's initial focus on graduate level education has expanded to include an extensive undergraduate program, a process accelerated with our absorption of the marine science programs previously offered by the privately-owned Southampton College of Long Island University. In spring 2007, MSRC was renamed The School of Marine and Atmospheric Sciences in light of the full range of educational programs it offered.

SoMAS has been thriving, owing to the work of our faculty, staff and students, and to the support of our friends. The school's Ph.D program was ranked by the National Research Council in 2010 as the 6th top program among all marine and atmospheric sciences programs in the nation. This report provides a brief synopsis of SoMAS over the two-year period, 2010 – 2011. The SoMAS community comprises approximately 100 resident faculty and staff, and about 150 graduate students and 600 undergraduate students. A comprehensive accounting of the School's varied programs and activities is beyond the scope of this report. Presented here are selected highlights that give the flavor of SoMAS, the nature and diversity of our activities, and the people who undertake them. A more extensive description of who we are and what we do can be found on the School's web page: http://www.somas.stonybrook.edu/.

We at SoMAS are pleased with our past achievements, but we have higher aspirations. Finding creative ways to meet the challenges and opportunities facing our society in dealing with the natural environment has never been more important. To discuss how you can join with us to surmount the challenges and realize the opportunities, please contact me.

Dr. Minghua Zhang, Dean and Director

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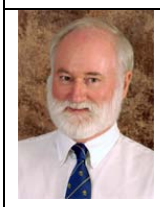
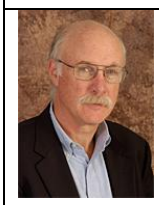
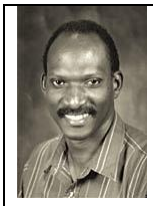
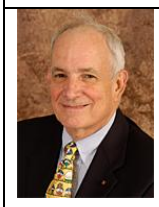
SoMAS Faculty 2010-2011			
	**Bassem Allam,** Associate Professor pathobiology and immunobiology of marine shellfish		**Josephine Y. Aller**, Professor marine benthic ecology, invertebrate zoology, marine microbiology, biochemistry
	**Robert C. Aller,** Professor marine biogeochemistry, marine animal-sediment relations		**Robert Armstrong**, Associate Professor mathematical modeling in marine ecology and biogeochemistry
	**David E. Black,** Assistant Professor paleoclimatology, paleoceanography, deep-sea sediments, marine micropaleontology		**Henry J. Bokuniewicz,** Professor nearshore transport processes, coastal groundwater hydrology, coastal sedimentation, marine geophysics
	**Malcolm J. Bowman**, Professor coastal ocean and estuarine dynamics		**Kurt Bretsch,** Assistant Professor marine and environmental science education, coastal community ecology
	**Bruce J. Brownawell,** Associate Professor biochemistry of organic pollutants in seawater and groundwater		**Robert M. Cerrato,** Associate Professor benthic ecology, population and community dynamics
	**Edmund K.N. Chang,** Professor atmospheric dynamics and diagnoses, climate dynamics, synoptic meteorology		**Demian Chapman,** Assistant Professor molecular ecology, conservation, elasmobranch (sharks, batoids) biology, acoustic and satellite telemetry
	**J. Kirk Cochran,** Professor marine geo-chemistry, use of radionuclides as geochemical tracers; diagenesis of marine sediments		**Brian A. Colle,** Professor synoptic meteorology, mesoscale numerical modeling and forecasting, coastal meteorology
	**Jackie L. Collier,** Associate Professor phytoplankton physiological ecology, biocomplexity and microbial diversity; planktonic ecosystem processes		**David O. Conover,** Professor ecology of fish, fisheries biology

	**Roman de Jesus,** Assistant Professor organic geochemistry, isotope analysis, DOC, chemical characterization		**Nicholas S. Fisher,** Professor marine phytoplankton physiology and ecology, biogeo-chemistry of metals, marine pollution
	**Charles N. Flagg,** Assistant Professor continental shelf dynamics, bio-physical interactions in shelf systems, climate change effects on coastal systems		**Roger D. Flood,** Professor marine geology, sediment dynamics, continintal margin sedimentation
	**Michael Frisk,** Associate Professor fish ecology, population modeling and life history theory		**Marvin A. Geller,** Professor atmosphere dynamics, stratosphere/mesosphere, climate
	**Christopher Gobler,** Professor phytoplankton, harmful algal blooms, estuarine ecology, aquatic biogeochemistry		**Sultan Hameed,** Professor climate change: analysis, impacts and predictability
	**Marat Khairoutdinov,** Associate Professor climate modeling, high-resolution cloud modeling, cloud microphysics, super-parameterization, massively parallel super-computing, cloud parameterization		**Daniel A. Knopf,** Assistant Professor atmospheric chemistry, microphysics and chemistry of atmospheric aerosols, heterogeneous atmospheric chemistry and kinetics
	**Cindy Lee,** Professor ocean carbon cycle, marine geochemistry of organic compounds, organic and inorganic nitrogen-cycle biochemistry, and silicate and carbonate biomineralization		**Ping Liu,** Assistant Professor climate change, dynamics and modeling; Unix/Linux supervisor
	**Darcy J. Lonsdale,** Professor ecology and physiology of marine zooplankton, food web dynamics of estuarine plankton and the impact of harful algal blooms		**Glenn R. Lopez,** Professor marine benthic ecology, animal-sediment interactions

	**Kamazima M.M. Lwiza,** Associate Professor structure and dynamics of shelf-seas and remote sensing oceanography		**John E. Mak,** Associate Professor stable and radioisotopes as tracers of chemistry, origin and transport in marine and atmospheric environments
	**Anne McElroy,** Professor aquatic toxicology		**Stephan Munch,** Assistant Professor Evolutionary ecology of growth and life history traits, applied population dynamics modeling, mathematical modeling and statistics
	**Heidi Pearson,** Assistant Professor marine mammal population dynamics		**Bradley Peterson,** Associate Professor community ecology of seagrass-dominated ecosystems
	**Ellen K. Pikitch,** Professor ocean conservation, fisheries mangagement, ecosystem-based approaches, endangered fishes		**Mary I. Scranton,** Professor marine geochemistry, biological-chemical interactions in seawater
	**R. Lawrence Swanson,** Professor coastal oceanography, marine pollution, marine boundaries, recycling and reuse of waste material, waste management		**Gordon Taylor,** Professor marine microbiology, microbial ecology, plankton trophodynamics and marine biofouling
	**Lesley Thorne,** Assistant Professor bio-physical and trophic interactions in marine ecology, application of spatial analysis and landscape ecology techniques to marine conservation		**Dong-Ping Wang,** Professor coastal ocean dynamics
	**Joseph D. Warren,** Associate Professor acoustical oceanography, zooplankton behavior and ecology		**Robert E. Wilson,** Associate Professor estuarine and coastal ocean dynamics
	**Minghua Zhang,** Professor climate modelling, atmospheric dynamics		**Qingzhi Zhu,** Assistant Professor biogeochemistry, environmental analytical chemistry, sensors

Adjunct Faculty (* = resident)

James Ammerman*, New York Sea Grant
Hannes Baumann*, SoMAS
Howard Bluestein, University of Oklahoma
Paul Bowser, Cornell University
Carl Brenninkmeijer, Max Planck Institute, GERMANY
Frank Buonaiuto, Hunter College
Michael J. Cahill, German & Cahill, P.C.
Andre Chistoserdov, University of Louisiana at Lafayette
Alistair Dove, Georgia Aquarium
Anja Engel, Alfred Wegener Institute, GERMANY
Mark Fast, University of Prince Edward Island, CANADA
Scott Ferson, Applied Biomathematics
Scott Fowler, Musee Oceanographique, MONACO
Steven L. Goodbred, Jr., Vanderbilt University
Kathryn Kavanagh, University of Massachusetts-Dartmouth
Paul Kemp, University of Hawaii
Stephen P. Leatherman, Florida International University
Wuyin Lin*, SoMAS
Yangang Liu, University of South Florida
Emmanuelle Pales Espinosa*, SoMAS
Nicole Riemer, University of Illinois at Urbana-Champaign
Frank Roethel*, SoMAS
Carl Safina*, Blue Ocean Institute
Andrew Vogelmann, Brookhaven National Laboratory
Duane E. Waliser Jet Propulsion Laboratory, NASA
Jian Wang, Brookhaven National Laboratory

Jointly-appointed Faculty

Stephen Baines, Assistant Professor, Ecology and Evolution
Robert L. de Zafra, Professor Emeritus, Physics
William H. Greene, Associate Professor, M.D., Epidemiology
Herbert Herman, Distinguished Professor Emeritus, Materials Science
Lee Koppelman, Leading Professor, Center for Regional Policy Studies
Manuel Lerdau, Professor, Dept. of Environmental Sciences, University of Virginia
Jeffrey Levinton, Professor, Ecology and Evolution
Dianna Padilla, Professor, Ecology and Evolution
Sheldon Reaven, Associate Professor, Technology and Society

Research

Research is fundamental to the SoMAS mission. The research conducted at SoMAS seeks to understand the way the marine, atmospheric and terrestrial environments function, as well as the effects and impacts of human interactions with these systems. These problems all require knowledge from multiple disciplines and the School of Marine and Atmospheric Sciences encourages interdisciplinary research. Many of our faculty pursue research in collaboration with scientists at other University departments as well as with scientists from academic institutions around the country and the globe. Unlike many academic institutions, we do not have traditional departments at SoMAS. What we do have is a large number of faculty and students who work together to better understand our planet.

All SoMAS faculty are expected to maintain an on-going research program that meets the highest standards of scientific inquiry and to regularly publish the results of their work in refereed scientific journals and other outlets. Research at SoMAS is generally carried out by a team headed by a faculty member that includes his/her graduate students, often aided by one or more undergraduate students. Some of the larger projects employ a full- or part-time research technician.

Research at SoMAS is externally-funded. Our faculty has a well-deserved reputation for success in securing grants and contracts from a wide variety of sponsors at the federal and state levels. Among the most frequent and important sponsors of research at SoMAS are several U.S. Federal agencies: National Science Foundation (NSF); National Aeronautics and Space Administration (NASA); National Oceanic and Atmospheric Administration (NOAA); Department of Energy (DOE); Environmental Protection Agency (EPA) and the Office of Naval Research (ONR).

The following pages contain brief synopses of research projects underway at SoMAS that are representative of the breadth and diversity of research at the School. More complete information on SoMAS research is available on the "Research" pages of our web site (http://www.somas.stonybrook.edu/research/), as well as under the profiles of individual faculty members (http://www.somas.stonybrook.edu/people/faculty.html).

Studying Regional Weather Patterns to Improve Offshore Wind Power

SoMAS Professor Dr. Brian Colle

The energy needs of the entire human population could potentially be met by converting wind energy to electricity by means of wind turbines. While offshore wind power resources are abundant, wind turbines are currently unable to provide steady power due to natural fluctuations in wind direction and strength. Offshore wind power output can be made more consistent by choosing project development locations that take advantage of regional weather patterns and by connecting wind power generators to a shared power line, according research by SoMAS Professor Brian Colle.

If wind power is to significantly displace carbon-emitting energy sources, the production rate of wind-generated electricity must be steadier. Colle and his colleagues demonstrated that thoughtful design of offshore wind power projects can make wind power more reliable by minimizing the impacts of local weather on power generation.

The researchers analyzed five years of wind observations from 11 monitoring stations along the U.S. East Coast from Florida to Maine. Based on wind speeds at each location, they estimated electrical power output from a hypothetical five-megawatt offshore turbine. After analyzing the patterns of wind energy among the stations along the coast, the team explored the seasonal effects on power output.

Colle and colleagues concluded that wind power transmission systems should be designed to consider large-scale meteorology, including the prevailing movement of high- and low-pressure systems.

Dr. Colle explains the ideal configuration. “A north-south transmission geometry fits nicely with the storm track that shifts northward or southward along the U.S. East Coast on a weekly or seasonal time scale,” he said. “Then, at any one time, a high- or low-pressure system is likely to be producing wind (and power) somewhere along the coast.”

The researchers found that each hypothetical power generation site exhibited the expected ups and downs, but when they simulated a power line connecting them, the overall power output was smoothed so that maximum or minimum output was rare. Reducing the severity of wind power fluctuations would allow sufficient time for power suppliers to ramp up or down power production from other energy sources as needed. In the particular five-year period studied, the power output of the simulated grid never stopped completely.

No wind turbines are presently located in U.S. waters, although projects have been proposed off the coasts of several Atlantic states. This research could prove extremely beneficial as project sites are selected and developed.

Researchers analyzed hypothetical power output from five-megawatt offshore turbines similar to the one shown here off the coast of Belgium.

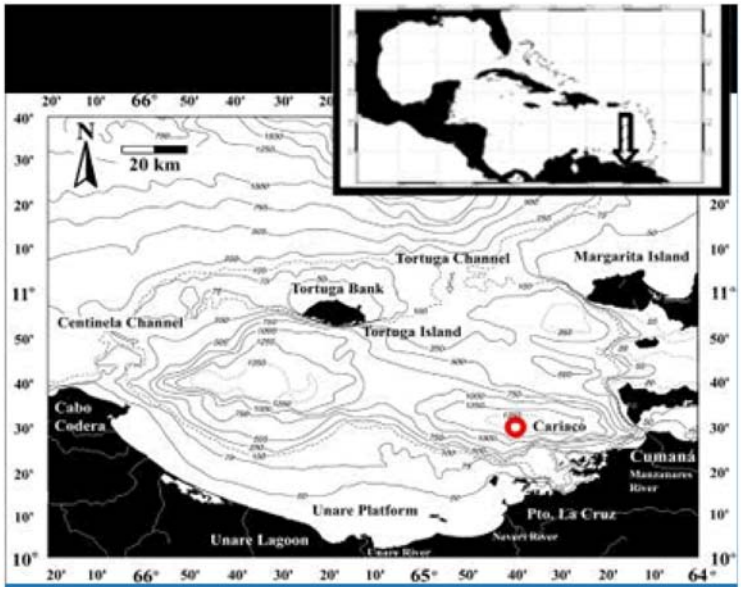
Photo courtesy of Hans Hillewaert.

The Cariaco Basin Project

Each year, in the spring and again in the fall, SoMAS Professors Mary Scranton and Gordon Taylor head for the Caribbean. Since 1995, Scranton and Taylor have been studying how large-scale oceanic-atmospheric phenomena and changes in climate affect the vertical transfer of carbon and nutrients at a continental shelf site. That site is the Cariaco Basin on the north-central coast of Venezuela.

The Cariaco Basin is comprised of two deep basins separated by a relatively shallow (900m) sill. Because the waters below about 250m depth are permanently anoxic, the sediments in the basins are unaffected by bioturbation and their vertical stratigraphy reflects changes in primary productivity in overlying waters. The Cariaco Basin is a very large sediment trap. What happens in the Basin stays in the Basin!

The Cariaco Basin's unusual geomorphology and undisturbed sediments make it an excellent place to study tropical climate change and how organic materials decompose along an oxic-anoxic gradient. The examination of both these phenomena are among the objectives of the Carbon Retention in a Colored Ocean (CARIACO) study, a long-term, time series study of the basin launched in 1995 by the National Science Foundation and the Fondo National de Ciencia, Technologia e Innovacion, the comparable Venezuela federal agency. The CARIACO project involves teams of scientists from several US and Venezuelan universities.



Venezuela's Cariaco Basin

Scranton and Taylor study the geochemistry and the microbiology of the water column in the Basin.

"We are really interested in the geochemistry and the microbiology that occurs through the transitional waters from where there is oxygen to where there's no oxygen," says Taylor. "That's where all the interesting changes are that make this particular part of the ocean different than most other regions"

Dr. Mary Scranton in the Cariaco Basin aboard a Venezuelean research vessel

The Basin's anoxic depths may offer a clearer view into the dynamics of the ancient ocean, which was largely anoxic until a out 2.8 billion years ago, when evolution of cyanobacteria caused gradual oxidation of the biosphere. Increasing portions of the modern ocean are experiencing varying degrees of oxygen depletion. Thus, the Cariaco Basin serves as a useful model to understand implications for future ocean conditions.

Because the Cariaco Basin system is variable and sensitive to climatic forcing, the study has benefited from its long duration.

"What we have learned in oceanography over the past 30 years is that, in fact, things fluctuate a lot and you can't really tell what is a long-term trend and what is a short-term variation," said Scranton, who has been studying the Cariaco Basin since the 1970s. Taylor said that time series observations are the most straightforward approach to document patterns and understand their causes.

Dr. Gordon Taylor

"The advantage of the time series is you get to make the same measurements again and again at the same place and start to actually see temporal patterns, time-varying patterns that you could only guess at by historical oceanographic sampling approaches, which equate to snapshots in space and time" said Taylor. Taylor offered that people should be concerned about emerging trends because of the increasing pressure society is putting on coastal environments. The human addition of excess nutrients stimulates the production of plankton and ultimately leads to the creation of anoxic "dead zones", as seen seasonally in the Gulf of Mexico and Long Island Sound.

Is Climate Change Affecting the Spring Bloom in Long Island Sound?

Seawater temperature in Long Island Sound appears to be increasing over the past three decades, as has been observed elsewhere along the northeast US coast over the same period. However, the warming has not been consistent year-round. Most of the increase has taken the form of higher water temperatures in the winter, especially in the bottom waters. Average summer temperatures in the Sound have changed little over the past three decades. Observers generally interpret the warming in the Sound as a local manifestation of a broader phenomenon — global warming.

SoMAS graduate student Jennifer George inspecting the contents of a net tow during the February 2010 spring bloom in Long Island Sound

SoMAS scientists Professors Darcy Lonsdale and Christopher Gobler and their students are examining whether warmer winter seawater temperatures may be affecting the timing and intensity of the Sound's environment: the spring bloom. The annual spring bloom of phytoplankton impacts a wide range of processes and characteristics in the Sound, from food web dynamics to the onset and severity of summertime hypoxia (low oxygen).

It has been demonstrated in other temperate coastal waters that the winter-spring bloom is suppressed during warm winters, and that zooplankton abundance increases while nutrient levels in the water column remain high. Is increased zooplankton grazing the mechanism behind bloom suppression during warm winters?

This is the "spring" bloom???

With support from the EPA Long Island Sound Study, the Lonsdale/Gobler research team has been examining the effect of seasonal temperature on zooplankton grazing during the spring bloom. Once the spring bloom began in early 2011, the research team took weekly samples for as long as the bloom persisted. In addition to the field sampling, the effect of temperature on zooplankton grazing is assessed experimentally through controlled laboratory trials.

The spring bloom, or the seasonal growth of phytoplankton, typically occurs in most temperate ocean ecosystems between January and March. The seawater begins to heat up and phytoplankton are trapped near the water's surface with just the right balance of light and nutrients. The convergence of these conditions leads to the rapid growth of phytoplankton and the creation of a higher than average biomass. Says Gobler, "Our hypothesis is that, in a warm winter, zooplankton grow quicker, graze (on phytoplankton) faster than they would otherwise and are able to essentially keep the spring bloom from getting too intense."

The spring bloom is important, because it is the source of the majority of the carbon that sinks to the bottom of Long Island Sound, where it serves as a food source for organisms. This process is especially important in the spring. In the summer, phytoplankton are typically smaller and consumed more quickly, leaving little carbon to sink to the bottom and feed organisms. During the winter, the relatively low amount of sunlight and colder water temperatures restrict phytoplankton growth.

Phytoplankton are at the base of the marine food chain and the reproductive cycles of some species of fish and zooplankton are synchronized with the timing of the spring bloom. At the spring bloom's start, there is an abundance of nutrients. An important aspect of the study is to monitor nutrient levels as well as zooplankton and phytoplankton abundance in the Sound to assure that it is zooplankton and not nutrient abundance that controls the spring bloom. "Looking at historical records, the data shows that in these warm winters, when there's not a spring bloom, there's actually plenty of nutrients around," said Gobler.

Dr. Lonsdale said their project is significant because it will examine how marine food web dynamics could change if global temperature increases. "The effect of temperature on plankton dynamics is an indicator of possible changes to come," she stated.

Threats and Stressors to Seagrasses in New York's Marine Waters

Seagrasses are a type of submerged aquatic vegetation – plants which spend their entire lives under the waves. Eelgrass, Zostera marina, is the dominant, northern temperate seagrass species in the world, occurring on both coasts of the US and Canada, as well as throughout northern Europe. Local Long Island waters are no exception – eelgrass is the dominant species.

Eelgrass meadows provide a variety of ecosystem services Eelgrass helps stabilize the sediments by an extensive root and rhizome network, but also by the blades baffling water currents. Eelgrass helps maintain water quality through absorption of nutrients and carbon dioxide, and the release of oxygen. It provides food to numerous species – eelgrass is a part of the diet of many native and introduced waterfowl. Lastly, eelgrass serves as a shelter for many resident marine species, a nursery ground for migrant species and a foraging ground for larger species.

In 2007, prompted by substantial declines in the distribution and abundance of seagrass, the New York State Legislature constituted the New York Seagrass Task Force and charged it with developing recommendations on how to best conserve and protect healthy seagrass meadows and, where meadows have been degraded or destroyed, how these areas can restored. The Task Force submitted its final report to the Governor and Legislature in December 2009.

Eelgrass Meadow

Scallop on Seagrass

SoMAS Associate Professor Bradley J. Peterson of SoMAS leads the charge in trying to understand what is happening with seagrasses around Long Island and what might have produced the considerable declines that have been documented. A major focus of Peterson's lab is examining the interplay between reduced light, increasing nutrients and increasing temperature, among other stressors – these are all now becoming common characteristics of many of our local estuaries. His students have carried out a series of lab experiments investigating these multiple stressors in both large and small mesocosms – essentially just a fancy scientific term for a bucket – but all projects include field components. "Sometimes, there is a disconnect between what happens in a controlled lab setting and what occurs in the field," says Peterson. "It is important that field experiments are conducted to corroborate the lab results."

The hope is that by gaining insight into these stressors and their interactions, impacted seagrass meadows can be more effectively restored and conserved. Like all plants, seagrasses require sufficient light and nutrients to grow. Nutrients are not typically considered to be limiting in New York's coastal waters because of the high levels of anthropogenic nutrient loadings these waters experience. However, nutrient loading leads to algal blooms, which can effectively shade out eelgrass lying further below. Low light resulting from poor water quality is typically considered the major contributing factor to seagrass loss. But Peterson warned, "It is not as simple as a low light issue. When we conducted extensive surveys in Great South Bay, we never encountered eelgrass in sediments consisting of more than 2% organic matter, indicating that there are other factors at play in controlling the extent of eelgrass in local waterways." This observation led to a New York Sea Grant-funded study of the impacts of multiple stressors on eelgrass in Long Island. An important aspect of this study is to examine the impacts of not just the stressors individually, but also in combination with each other.

Some of the research findings to date from the Peterson group include:

- Injecting sulfide* into the seagrass sediments in the lab reduces growth on its own
- A combination of sulfide injection with other stressors, such as reduced light and increased water temperature, leads to more dramatic growth reduction and loss
- In field experiments, the sediment sulfide is increased by boosting the organic content in the sediments
- Shade and sulfide impact seagrass growth in the field, although the extent is not quite so dramatic as in the laboratory
- While nutrients are a vital building block for seagrasses, extremely high nitrogen content groundwater has a negative impact on seagrass growth
- The herbicide Diuron, formerly used on farms for weed control, and introduced to the bays through groundwater seepage, has a negative impact on eelgrass growth
- Hard clams are capable of alleviating light and nutrient stresses to eelgrass, enhancing growth of grass in both lab and field settings
- The clams burrowing activities have not been demonstrated to alleviate sulfide stress
- Despite the multiple stressors, eelgrass populations in Great South Bay are genetically diverse, which might indicate either some level of ecological resilience or the last reproductive gasp of a clonal organism

*sulfides – Hydrogen sulfides are produced in the sediments when bacteria breakdown organic matter in the absence of oxygen. This occurs in many estuarine sediments. Sulfides are also toxic to seagrasses, so having high sulfide concentrations in the sediments can harm the root-rhizome complex.

Shrimp on Seagrass

Using Isotopes as Tracers of the Chemistry, Origin and Transport in Atmosphereic and Marine Environments

"Mudding about" in a mangrove swamp on the coast of French Guiana

The School of Marine and Atmospheric Sciences incorporates two distinct but closely-related units that organize and conduct its research and educational programs. On the atmospheric side, there is the Institute for Terrestrial and Planetary Atmospheres (ITPA). The marine realm is the primary purview of the Marine Sciences Research Center (MSRC). While frequent and close collaboration between scientists from each unit is a hallmark of how SoMAS operates, at least one of the School's faculty, Professor John E. Mak, has his feet firmly planted in both environments (as well as on *terra firma!).*

Mak is an atmospheric and marine chemist and an associate professor in ITPA. He and his students use stable and radioisotopes as traces to elucidate chemical reactions and transport processes in the environment. Isotopes of an element have slightly different chemical and physical properties because of their mass differences (due to different numbers of neutrons in the nucleus). For some elements, these mass differences are large enough for many physical, chemical and biological processes or reactions to "fractionate" or change the relative proportions of the isotopes. As a result of fractionation processes, materials often develop unique and detectable isotopic compositions (ratios of heavy to light isotopes), which may be indicative of their source or of the processes that formed them. Using isotopic tracers, Mak can learn how things happen within and between the atmosphere and the ocean, today as well as in the past.

Work with colleagues in France, Mak, Zhihui Wang (a postdoctoral scientist at SoMAS) and Ph.D student Key Hong Park conducted research on biomass burning in the southern hemisphere. "Basically, we reconstructed biomass burning over the last 650 years in the southern hemisphere and we did that by looking at ice cores. We measured the stable isotopes of carbon monoxide from [Antarctic] ice cores, which is the first time anyone has ever done that," said Mak. He and his team have been working on the project for four years, two of which involved the study of ice cores.

"There seems to be a correlation between general climatic conditions, temperature/precipitation, and the rate of biomass burning but it's sort of hard to say because it's difficult to reconstruct specific precipitation patterns accurately and quantitatively; but, qualitatively, it seems that the two coincide," said Mak. "The implications are pretty clear that biomass burning has gone up and down in the past 650 years in the southern hemisphere…in a way that we would not have predicted. It appears that there were bigger changes over the last thousand years in the terrestrial environment than we really knew about before."

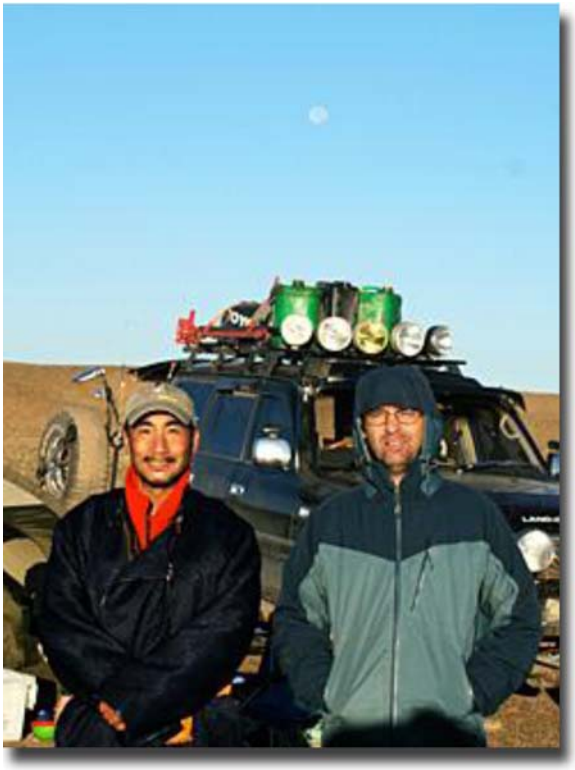
Another of Mak's current projects is being conducted in the US Forest Service's Manitou Experimental Forest in Colorado. This work uses a proton transfer reaction time of flight mass spectrometer (TOFMS), an instrument that precisely measures a wide range of masses in the atmosphere, allowing for the measurement of oxygenated reactive gases. The instrument is one of only three of its kind in the United States. The project focuses on the role of the biosphere in atmospheric chemistry.

Alex Guenther and John Max

"If you're interested in the chemistry of the atmosphere and you want to know what controls that chemistry, you want to know the role of the biosphere, like forests, and how much they influence regional chemistry," explained Mak.

Scientists have been studying the effects of biogenic emissions, or trace gases, since the 1980's. "There's still a lot we don't know," said Mak. "We want to try to separate and understand biogenic versus anthropogenic influences on chemistry and climate. We think it's important. The instrumentation that we have today allows us to better understand the processes involved. We think there's going to be a lot of interesting stuff coming out of it."

Mak has also worked on a project tracing the loss of the hydroxyl radical (OH) from the atmosphere by using 14C monoxide as a tracer. Carbon-14 monoxide is used, said Mak, because it is produced throughout the Earth's atmosphere, and later removed by OH. If the atmospheric 14C inventory is measured, the loss rate of OH can be calculated. "OH is the most important atmospheric oxidant," explained Mak. "It's very, very reactive. It's very short-lived and there's not much there, but it's responsible for the removal of almost all reactive trace gases in the atmosphere, so it's often referred to as the "detergent" of the atmosphere; it removes carbon monoxide, methane, ethane, propane--any sort of reduced compound. It will most likely react with OH and be removed by that, so it cleans up the atmosphere. It's a natural detergent."



John Mak and colleague Dr. Alex Guenther, senior scientist at the National Center for Atmospheric Research, in Mongolia

Most of Mak's studies are funded by the National Science Foundation, the nation's premier federal agency supporting research. Recently, he had an opportunity to spend time on the other side of the funding arrangement, serving for three years as the Program Director for NSF's Atmospheric Chemistry Program (ATC) under an Intergovernmental Personnel Act (IPA) assignment. As Program Director, Mak evaluated proposals for potential research grants. He noted that the position allowed him to approve some interesting proposals. "That's one advantage of being a program director. You can guide the focus of the atmospheric chemistry program," said Mak. "You can have an influence as to what kind of research is supported at the national level, which is kind of neat."

The position also gave Mak an appreciation of how dedicated program officers are at NSF. "I was impressed by my colleagues in NSF and, of course, I learned quite a bit about the funding mechanism and about the overall priorities, national priorities…I learned quite a bit," said Mak. While he was at NSF, Mak retained his position on the SoMAS faculty, conducting his research and supervising his students at something of a distance. He returned full-time to Stony Brook in October 2010.

Labyrinthulomycetes Get Some Respect!

SoMAS Professor Dr. Jackie Collier

SoMAS Associate Professor Jackie Collier is leading a team of microbiologists in a study of four species of labyrinthulomycetes whose genomes will be sequenced by The Department of Energy's Joint Genome Institute.

"Labyrinthulomycetes are a huge group of organisms that behave ecologically like fungi," said Collier. "But we know so little about them and there is more diversity among this group than among all the animals you can think of."

Labyrinthulomycetes are single-celled marine decomposers that eat non-living plant, algal, and animal matter. They are ubiquitous and abundant—particularly on dead vegetation and in salt marshes and mangrove swamps.

Although most labyrinthulomycetes species are not pathogens, the organisms responsible for eelgrass wasting disease and QPX disease in hard clams are part of this group. In some regions, labyrinthulomycetes may be as important as bacteria in degrading organic matter. In coastal systems, the abundance of bacteria is tied to levels of organic matter from marine sources, while the abundance of labyrinthulomycetes is more closely tied to levels of particulate organic matter from land sources. This suggests that labyrinthulomycetes may play an important role in the marine carbon cycle by breaking down material that is difficult to degrade.

Because labyrinthulomycetes—unlike bacteria—make long chain polyunsaturated fatty acids (PUFA's), they are also thought to improve the nutritional value of poor quality organic detritus.

"The genome sequences will provide a quantum leap in our understanding of the physiological capacity of these organisms," said Collier. "The genes can tell us which enzymes a species is capable of producing, which in turn tells us what kinds of material they can potentially degrade and what role they play in a marine ecosystem's food web."

Two of the species being sequenced are the best-studied labyrinthulomycetes, which were first cultivated several decades ago, and appear to be involved in the decomposition of terrestrial plant material in coastal marine ecosystems. A third species belongs to a group of labyrinthulomycetes that has only been recognized in the last decade but that Collier's lab has found to be the most abundant type of labyrinthulomycete in bays around Long Island. The fourth species belongs to a group of labyrinthulomycetes that can cause diseases in plants, including eelgrass wasting disease, which has devastated seagrass meadows worldwide.

In a complementary project, the Gordon and Betty Moore Foundation is funding extensive sequencing of genes being expressed by four species of labyrinthulomycetes during growth on four different types of organic matter. The four species comprise the first three being sequenced by JGI plus a species belonging to a very newly recognized group of labyrinthulomycetes that is also very abundant in Long Island's coastal waters. This data will show how genes identified in the JGI sequencing project are used by the organisms under different growth conditions.

In addition to revealing more about their ecological roles, genomic information might suggest ways to exploit labyrinthulomycetes in novel biotechnological applications. Labyrinthulomycetes produce a wide array of enzymes and some species can degrade crude oil. Also, some labyrinthulomycetes are currently cultured to PUFA's for nutritional supplements. If PUFA's derived from labyrinthulomycetes were to replace fish oils and meal used in aquaculture and animal farming, it would likely reduce the number of fish caught for use as animal feed and have a positive impact on the health of the world's oceans.

Labyrinthulomycetes
Photo Credit:
Enixy Collado Mercado
Stony Brook University

Innovative Optical Chemical Sensors

SoMAS Professor Dr. Qingzhi Zhu

SoMAS Assistant Professor Qingzhi Zhu creates optical chemical sensors that permit new observations of biogeochemical reactions associated with organic matter diagenesis in marine sediments.

Zhu's sensors can be used to examine a two-dimensional plane going perpendicularly into the sediment. They enable researchers to make in situ observations of properties such as pH, oxygen, or hydrogen sulfide. "It's like looking through the window of an ant farm," says Zhu.

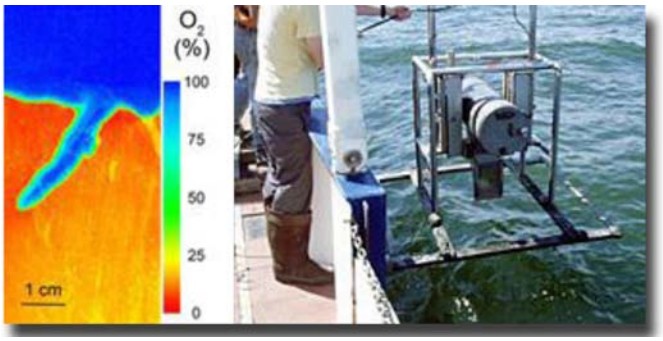
"It's important to be able to examine an area without disturbing it. Before these sensors, we could not make observations around a feature like a worm burrow because moving a sediment sample into the lab for measurement was likely to disturb its physical, chemical and biological characteristics. With these sensors, we are able to watch as the concentration and spatial distribution of solutes change over time."

Zhu was appointed as an assistant professor at SoMAS in fall 2008, but he had been part of the SoMAS community since 2002, as a research scientist and adjunct faculty member working with Professor Robert Aller. Zhu specializes in the development and application of optical sensors for examination of biogeochemical heterogeneity and dynamics in marine sediments.

Zhu came to SoMAS after spending two years at the Technical University of Munich, Germany, where he studied hydrochemistry as a recipient of an Alexander Von Humboldt Foundation Research Fellowship.

Notes SoMAS geochemist Professor Kirk Cochran, "In his time at SoMAS, Zhu has developed innovative optical chemical sensors that permit new observations of biogeochemical reactions associated with organic matter diagenesis in marine sediments. The research in this area is virtually unique to Stony Brook."

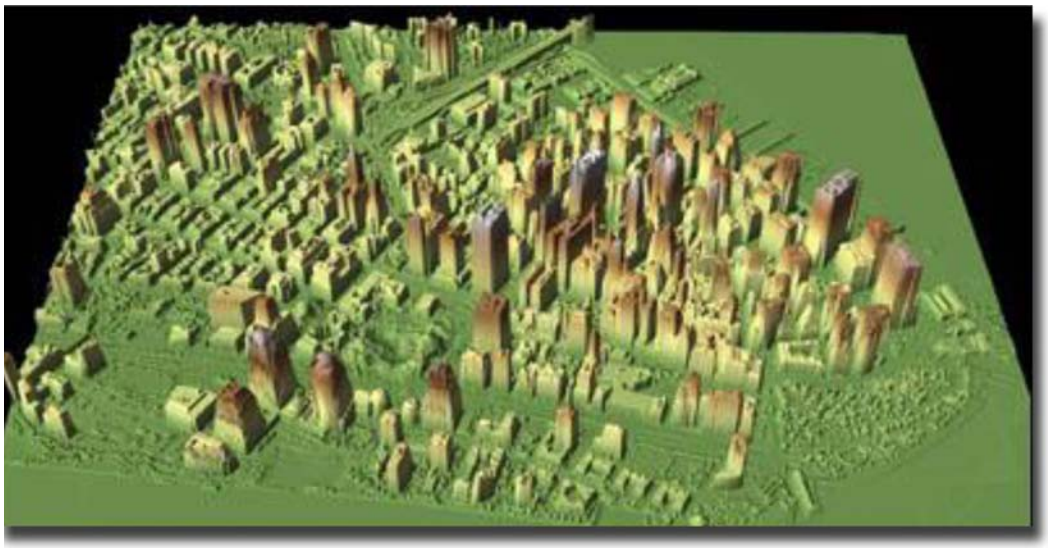
By obtaining measurements of chemical and biological parameters with high spatial and temporal resolution, researchers can better conceptualize and model heterogeneous biogeochemical reactions, microbial metabolism, and solute transport in bioturbated deposits. "These measurements can help us confirm and refine the models," says Zhu.



Left: Optical sensors reveal oxygen distribution in sediment in the presence of the worm, Nereis succinea.
Right: Deploying an optical sensor for in-situ measurements.

The Stony Brook Storm Surge Group

The retreat of summer signals the beginning of hurricane season, and with it, the possibility of storm surges in the New York Metropolitan area. Surges occur when severe storms push warm water onto the shore, causing floods that erode the landscape and destroy property. The Stony Brook Storm Surge Group, coordinated by SoMAS Professor Malcolm Bowman, was formed to evaluate how successful storm barriers may be in the future protection of New York City against possible storms and rising waters.



LIDAR image of business district of Manhattan showing seawall locations and elevations. The imager is flying above the Hudson River, looking east.

In their eighth year, the team continuously monitors and models storm formation. Though one might think that Long Island provides the city with natural geographic protection from the wrath of hurricanes and winter storms, called nor'easters, the Sound actually allows wind to channel surges towards the city. Like many coastal cities, New York City has an increased flood risk due to global sea level rise over the next 100 to 150 years.

Bowman and his team study the nuances and behavior of storm surges and are specifically investigating hurricanes and predicting the paths they may take. Hurricanes originate in the tropics, where they gather energy and power from warm tropical water, and can move north.

"The ones that stay offshore are the ones you have to worry about," Bowman said. The team is presently working on an online warning system to forecast coastal flooding. If there is an alarming reading recorded, the team relays the information to the authorities. "[The authorities] will get information from a variety of sources and so they will use their own best judgment as to what to do, whether to put out an alert or a coastal warning or an evacuation alert," Bowman explained.

The most devastating hurricane in recent memory did not occur on Long Island, but in the Gulf. In 2005, Hurricane Katrina shocked the nation as the damage and human devastation was broadcast worldwide. "That got people thinking a little more about the vulnerability of New York," said Bowman. The event forces people to think beyond the academic realm of possible flooding and hypothesize that because it happened down in New Orleans, could it happen up in New York, Bowman said. New York and Miami are the East Coast cities most vulnerable to flooding, said Bowman. San Francisco is also vulnerable.

The group's study of storm surges requires attention to a single storm's unique qualities, such as the location of its landfall, its speed, movement and the angle at which it hits the shore. The unique combination of these factors determines the amount of damage that a storm can do.

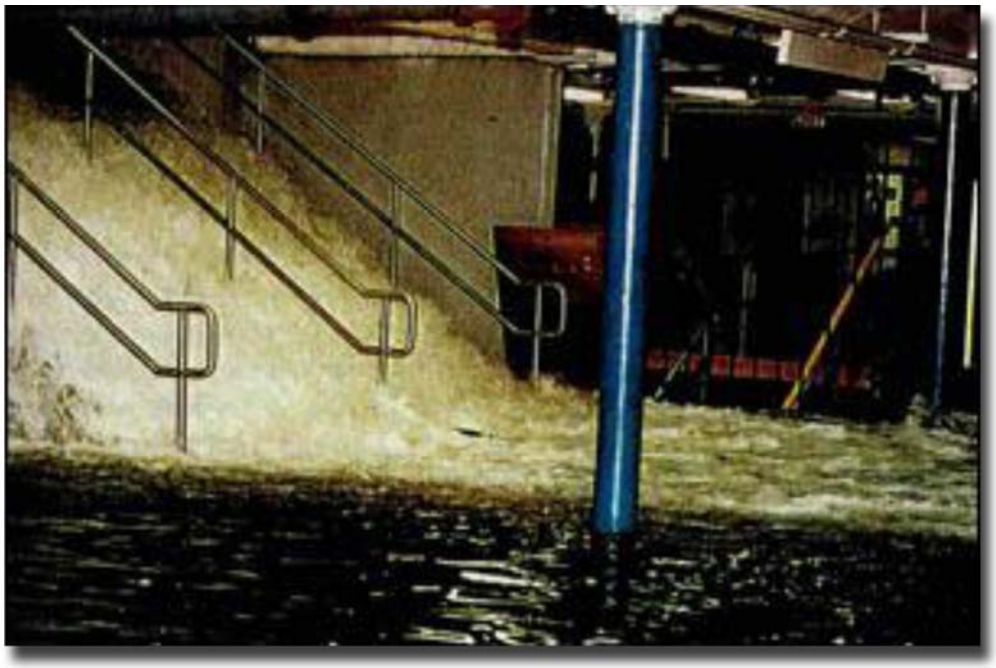
"Every storm has a personality, no two storms are ever alike," said Bowman. "The surge, the mound of water that piles up, is very, very dependent on the exact personality of the storm."

Nor'easter storm surge flooding tends to occur slowly but endures for a few days. Funded by New York Sea Grant, the group's monitoring requires the use of computer programs

and information gathered by the National Weather Service, tide measurements collected from National Oceanic Survey Stations that dot the shoreline around the Battery, Kings Point, Port Jefferson, New Haven, New London and Sandy Hook and readings from NOAA buoys. These measurements allow the team to compile forecasts up to two days in the future.

Once the forecasted day has passed, the team compares the weather that actually occurred with predictions of meteorological forecast and storm surge ocean models to check the accuracy of their predictions.

"Predicting the future's never perfect…but we're doing pretty well," said Bowman.



Flooding of train stations during the 1992 nor'easter. Photograph from the Metro New York Hurricane Transport Study, 1995.

Mysteries of the Great White

In 1971, Peter Matthiessen's *Blue Meridian* was published, the vivid first-hand account of American filmmaker Peter Gimbel's global quest to find and be the first to film the great white shark underwater. Soon after the book was published, came the film version of the expedition, *Blue Water. White Death*. *Jaws* arrived a few years later and the rest, as they say, is history.

Both Gimbel and Matthiessen were New Yorkers. They really needn't have travelled to such far-flung locales as South Africa, Ceylon and Dangerous Reef South Australia to find the most famous shark in the sea. At one time, the ocean waters off eastern Long Island held one of the largest seasonal aggregations of white sharks to be found anywhere in the world. Assistant Professor Demian Chapman of the Institute for Ocean Conservation Sciences (IOCS) at SoMAS is an elasmobranch (sharks & rays) specialist. He's turning his attention to white sharks, especially the population seasonally present here in the Northeast, and attempting to fill in some knowledge gaps, and perhaps debunk some myths, about this near-mythical animal.

Much more has been written about *Carcharodon carcharias* than is actually known about it. One example of our incomplete understanding of this species involves its preferred habitat. White sharks have historically been described as a coastal species that inhabits temperate waters. Many of the established white shark hotspots are indeed in temperate latitudes -- South Australia, South Africa, the North Pacific and northwestern Atlantic. However, recent tagging research is starting to broaden this picture. Some tagged whites have traveled thousands of miles, spending considerable amounts of time in the open ocean and diving as deep as 3,000 feet. Further, many of the tagged animals have ended up in tropical locations, such as Fiji and Hawaii.

One objective of Chapman's work is ascertaining why the population of white sharks in the U.S. Northeast has declined since the 1950's and 1960's, when the big fellows (actually, females are larger than males) were regularly sighted and/or caught off eastern Long Island. Why be concerned about white shark populations? One reason is that the loss of white sharks could have serious ecological implications. Mature great whites are apex predators – the top consumers on the marine food chain. They consume prey such as large tunas, seals and porpoises which typically have no other natural predators. These prey, in turn, consume a variety of other organisms. Loss of white sharks can potentially have effects that ripple through the food web, producing what is known as a trophic cascade.

Chapman has documented a significant decline in the sightings and landings of white sharks in the Northeast over the past 40 years. Today, sightings of great whites in New York's local waters in the summer are infrequent.

Great White Shark

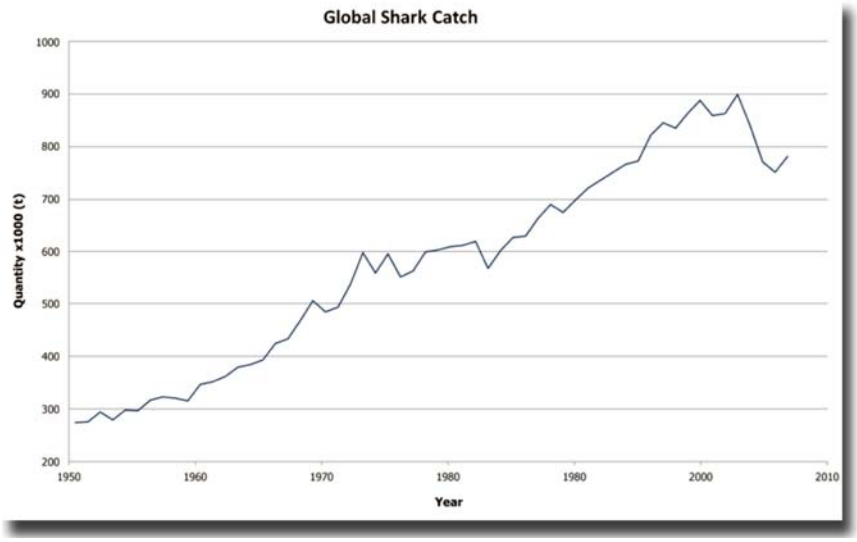
Catching and landing a white shark anywhere along the U.S. East Coast has been prohibited since 1999 under the federal Fishery Management Plan for Atlantic Tuna, Swordfish and Sharks. Despite this ban, some whites are still caught as incidental by-catch in other fisheries. Like all sharks, great whites are unusually susceptible to the effects of fishing. They grow slowly, become sexually mature at a relatively late age, often reproduce only every other year and produce few offspring.

Chapman has seen evidence that the white shark population in the Northeast has either experienced a significant decline and/or it has always been small. Tests reveal an extremely low level of genetic diversity in the population, similar to other species which are known to be either naturally rare or to have experienced significant declines. Chapman hypothesizes that local white sharks have experienced a recent population bottleneck – a term that describes an event where a significant percentage of the population is lost and could result in problems such as inbreeding.

Chapman and his students are now testing this hypothesis directly by looking at the genetic diversity of white shark samples archived from the 1960s through to the present.

Is the atavistic fear that the great white so often generates at all justified? “Not really,” remark Chapman and others who study sharks. They acknowledge that this is a large and potentially dangerous predator and it should be treated with respect and caution. Seen underwater, the great white is truly majestic. More fundamentally, its decline as an apex predator in the marine food web may trigger collateral changes in the abundances of other species with negative ecological or economic consequences. In its interactions with humankind, the great white, like all sharks, has been much the loser (see figure on global shark commercial fishery catch). Last summer, the U.S. Coast Guard distributed an advisory alerting the public to the sightings of white sharks in coastal waters of the Northeast. The advisory was meant as a warning. Perhaps the warning should have noted not the appearance of the great white, but its disappearance.

Global Shark Catch



Aerosols in the Atmosphere

This January, atmospheric chemistry Assistant Professor Daniel A. Knopf began his fifth year at the School of Marine and Atmospheric Sciences. In his relatively short tenure at SoMAS, Knopf has embarked on a number of projects focusing on the role of aerosols in the atmosphere. An aerosol is a suspension of fine particles or tiny liquid droplets in a gas. Smog, smoke and air pollution are aerosols. One of Knopf's projects involves ice nucleation; another deals with the heterogeneous kinetics of aerosols and a third and most recent (2010) treats of the measurement of volatile organic compounds in the Manitou Experimental Forest in Colorado in collaboration with professor John Mak. These projects, although developed separately, are thoroughly interconnected from Knopf's perspective.

"You could see (these projects) as separate," said Knopf. "But the overall idea or aim for me personally is to have characterized a suite of different aerosols and their potential to interact with ice clouds or to form ice clouds. Then, if we have a characterized wider range of different particles, there might be a good chance to derive physically- and chemically-based parameterizations of these processes."

Aerosol particles are important because they interact with solar and terrestrial radiation. The particles both absorb and reflect parts of the electromagnetic spectrum, including visible light, infrared radiation and ultraviolet radiation. They play a role in the radiative budget between Earth and the Sun. Clouds, which are important in maintaining the Earth's radiative budget, are also a function of the presence of aerosols in the environment. Cloud formation requires aerosol particles. Without aerosols, Earth would have an atmosphere and the "greenhouse effect" would be possible, but clouds as we know them would not exist and there would be no rain. Aerosol particles such as pollen or industrial soot also play a role in air quality, which can impact human health.

Knopf's ice nucleation project, funded through the National Oceanic and Atmospheric Administration, examines the transition of aerosol particles from liquid to solid phases and the formation of ice in the atmosphere. The project requires an optical microscope coupled to home-built ice nucleation cells which allow cooling of particles to temperatures as low as -93° Celsius. This allows studying the freezing of pure water, which does not occur at 0° C (the melting point of ice) but, rather, at -40° C. Temperature and relative humidity control at these low temperatures is challenging and instruments with this capability are not commercially available. "There are some commercial cryo-cooling stages available but they do not fit all our experiments and so, many of them, we built by ourselves," said Knopf. "We do experiments where we need to control relative humidity and temperature similar to the atmosphere, which subsequently governs the phase transition of the aerosol particle. This instrumentation you cannot buy. You have to design it yourself."

The ice nucleation studies are complimented with single particle chemical analyses utilizing the Lawrence Berkeley National Laboratory's synchrotron light source and Pacific

Northwest National Laboratory's environmental scanning electron microscope.

Knopf's heterogeneous kinetics project also requires custom-made instrumentation. The chemical ionization mass spectrometer, which measures the concentration of atmospheric radicals like OH, ozone and nitrate radicals *in situ* was built at Stony Brook University. Knopf designed the instrument and the Physics Department's machine shop fashioned its components. The project examines the chemical and physical changes that occur as gas molecules react with aerosol particles.

"We measure the chemical kinetics between gas phase species and an aerosol surface," explained Knopf. "For example, we measure how quickly an ozone molecule reacts with an organic particle. We can give this a number." The most prominen t effect of such heterogeneous reactions is the loss of atmospheric ozone, manifested in the Antarctic ozone hole.

In collaboration with Mak, Knopf uses one of the few high resolution proton transfer reaction time-of-flight mass spectrometers in the United States to measure and identify biogenic volatile organic compounds (VOC's) emitted by plants in Colorado's Manitou Experimental Forest.

Explains Knopf, "If these VOC's are in the atmosphere, they can react with other gas phase species, like ozone or the hydroxyl radical, that can result in oxygenation of the VOCs, which can condense and again form particles, so-called secondary organic aerosols. The big interest is how, for example, a forest, which emits VOCs, can form new particles as a source of aerosol particles. With this instrument, we want to measure VOC fluxes and emission rates. It's a gas phase measurement but it can lead to insight on how aerosol particles form. We measure the precursors of some of the aerosol particles." The time-of-flight spectrometer was procured via a Major Research Instrumentation grant from the National Science Foundation.

Daniel Knopf (center) with two members of his team, technician Tracey Evans (l) and Ph.D. student Luping Su (r).

Education Programs

The education and training of the next generation of atmospheric and marine scientists is an essential aspect of the SoMAS mission. Additionally, graduate and undergraduate students play a critical role in the cutting-edge research conducted at the School. Students at SoMAS have the opportunity to get to know and work closely with world-class faculty, take field courses, and conduct research in a wide range of coastal and oceanic environments. SoMAS offers classes at the Stony Brook and Southampton campuses where students have access to world-class facilities well-equipped to support research and education in a wide variety of oceanographic and atmospheric disciplines.

The following are the undergraduate and graduate degree programs offered at SoMAS, and their present enrollments.

Undergraduate Degrees (current enrollment = 500)

B.S. in Atmospheric and Oceanic Sciences (32)

The Atmospheric and Oceanic Sciences (AOS) program is structured to meet the educational needs of students wishing to pursue meteorology-related careers. The School's location allows for detailed study of coastal weather phenomena, such as hurricanes, nor-easters, and sea-breezes, as well as regional climate change in a coastal-urban environment. AOS majors are prepared for a range of career options including weather forecasting, environmental meteorology, broadcast meteorology, and graduate school in atmospheric sciences. The Bachelors degree meets the requirements for employment as a meteorologist with the National Weather Service and private companies, and the curriculum also satisfies the education standards endorsed by the American Meteorological Society. With strong background training in physics, mathematics and computer science, our AOS majors are also well prepared for a variety of alternative career paths.

B.S. in Marine Sciences (139)

Marine Sciences is a highly interdisciplinary field requiring an understanding and application of basic science, including biology, physics, and chemistry. In particular, the Marine Sciences major provides students with a solid background in basic biology as well as in the physics and chemistry of the ocean. Upper-division electives permit each student to gain a deeper understanding of particular groups of organisms (microorganisms, algae, marine invertebrates, fish, and marine mammals) and of habitats (salt marshes, rocky inter tidal, barrier islands, dunes, estuaries, and the open ocean). A Minor in Marine Sciences is also available (22).

B.S. in Marine Vertebrate Biology (109)

The Marine Vertebrate Biology major provides students with a solid background in basic biology with an emphasis on marine vertebrate organisms such as fish, sharks, birds, turtles and marine mammals. It provides a more intensive zoology background than the Marine Sciences degree.

B.A. in Environmental Studies (172)

The Environmental Studies major, leading to a Bachelor of Arts degree, is designed to provide students with the analytical and communication skills and the broad background necessary to understand and address complex environmental issues. The major also offers the opportunity for students to carry out focused study within a specific area of interest. Environmental issues are not resolved in the scientific, technological, social or political arenas alone. The curriculum is, therefore, interdisciplinary and integrates principles and methodologies from the social. sciences, engineering, the natural sciences and humanities. The goal is to address the complex scientific, legal, political, socio economic and ethical issues that define and surround environmental issues. A minor in Environmental Studies is also available (26).

Graduate Degrees (current enrollment = 146)

M.S. in Marine or Atmospheric Sciences (31)

The Masters of Science Degree at SoMAS features separate tracks in the marine and the atmospheric sciences.
The M.S. program, marine sciences track, consists of a rigorous interdisciplinary approach to oceanographic processes. The program is ideally suited to prepare students for positions in research, management, environmental protection and resource development. Graduates will have a firm basis for more advanced study and the tools and training needed for effective careers.

The M.S. program, atmospheric sciences track, provides students a rigorous training in atmospheric physics, thermodynamics, dynamics, radiative transfer, and their application in weather forecasting, satellite and conventional atmospheric data analysis, numerical modeling and climate change. Students gain strong communication, analytical and computer skills for positions in research, education, management and environmental protection.

Alumni

M.A. in Marine Conservation and Policy (25)

Established in 2010, the Masters of Arts Degree in Marine Conservation and Policy provides students with an understanding of contemporary marine conservation and policy issues. It equips students with the skills necessary to apply this knowledge in marine conservation positions that require advanced training and a broad skill-set, but are not research-based. Graduates of this program should compete effectively for positions in government, environmental consultancy, and non-governmental organizations, and to apply marine conservation and policy knowledge in other fields such as law, teaching, communications or business.

Ph.D. in Marine or Atmospheric Sciences (90)

The Ph.D. program at SoMAS prepares students to identify and solve problems in the oceanographic and/or the atmospheric sciences. It builds on a flexible, interdisciplinary program and trains students to become effective, independent thinkers and problem-solvers. Students are free to emphasize their own interests in oceanography and/or the atmospheric sciences, but are expected to acquire a broad base of interdisciplinary knowledge. Ph.D graduates are prepared to compete successfully for postdoctoral and faculty appointments as well as for positions directing research at government or industrial laboratories, and managerial positions at not-for-profit and government agencies.

Semester-by-the-Sea Program

First offered in Fall 2011, the Semester-by-the-Sea program is designed for undergraduate students to spend a semester immersed in marine studies at the Stony Brook Southampton campus. The program uses an experiential learning approach, taking full advantage of the Southampton Marine Science Center, its research vessels, its waterfront marine lab facilities, and the unique campus location on the shores of Shinnecock Bay for direct access to estuaries, bays and the Atlantic Ocean.

The program offers students intensive studies of the diverse marine habitats of eastern Long Island including bays, estuaries, salt marshes, rocky intertidal zones, dunes, beaches, tidal flats, and the open ocean, as well as of current environmental issues related to these ecosystems. It also introduces students to the historic and contemporary maritime traditions of Southampton, Long Island, New York and New England through classes and focused field trips to sites that have shaped these traditions.

One of SoMAS' paramount objectives is to educate and train students to become the next generation of marine and atmospheric scientists, environmental resource managers, and citizens who possess a fundamental grasp of environmental issues and the choices that society faces in handling these issues. The alumni of our undergraduate and graduate education programs thus represent perhaps most important of the School's "products", extending the influence and impact of SoMAS on the broader society of which it is a part. Of all the things we produce, our alumni are inarguably the most valuable and have the most impact on the issues and problems that command the School's attention. SoMAS alums occupy a dizzying variety of positions within academia, natural resource management agencies at all levels, and in the offices of non-governmental organizations. Alumni are often in a position to play a critical role in support of various SoMAS research and educational efforts. Their potential as a source of development funds to initiate new programs remains largely untapped. Several SoMAS alumni are represented on the Dean's Council, a small assembly of influential individuals who advise the Dean on overall program development priorities and help get initiatives underway. Several years ago, SoMAS began a concerted effort to strengthen connections with its alumni. This work has continued during the period covered by this report. As it is being written, several staff are working to streamline, update and consolidate our alumni records so that our future communications with alumni are more comprehensive, reliable and, ultimately, effective.

MSRC/SoMAS produced its first masters degree graduates in 1971 and, a decade later, its first Ph.D. recipients. Through the years, 859 students have joined the ranks of SoMAS alumni, 193 with the Ph.D. and 598 with a masters degree, and 68 students received both degrees. As of December 2011, a total of 182 students have graduated with an undergraduate degree from SoMAS. Of these, 87 received the Environmental Studies degree, 19 the Atmospheric Sciences degree, 22 the Marine Sciences degree and 54 the Marine Vertebrate biology degree.

The following are few brief vignettes of SoMAS graduate alumni from several eras, describing their career paths since they passed through our doors. To each of our alumni, there is a story.

Profile, Gregg J. Rivara, 1985

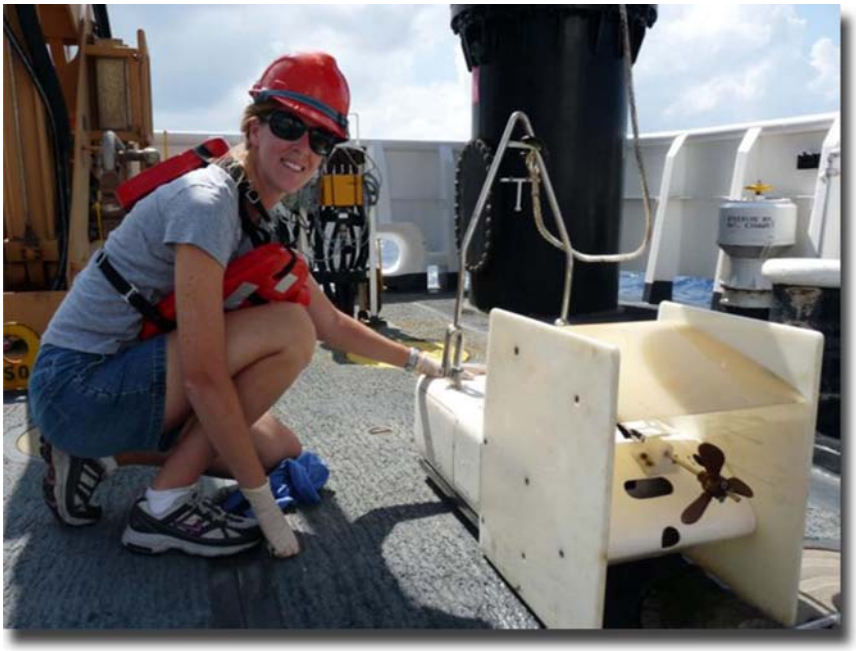
Aquaculture specialist Gregg Rivara has a certain affinity for Long Island. He grew up in Queens, received his Bachelor's degree from Southampton College of Long Island University (now a satellite campus of Stony Brook) in 1982 and, soon after, began his Master's degree at the Marine Science Research Center (now SoMAS). When he first arrived at MSRC, he had a research assistantship with Dr. Doug Capone and Dr. Ed Carpenter working with bacteria and microalgae, but Gregg's true passion was shellfish. That's when he connected with Dr. Robert Malouf, who helped Gregg receive a Sea Grant scholarship to pursue work with hard clams. His Master's thesis examined how light and flow affect burrowing of very small, recently-set hard clams.

While Gregg was finishing his thesis, a job became available as a grant-funded lab technician at MSRC, so he remained in the family for a few months after finishing in December of 1985. However, Gregg was getting ready to settle down and decided that he needed to find work that wasn't based on "soft money". He took his Civil Service test and, in 1986, was hired by the Town of Islip as a Bay Management Specialist. While there, he participated in a variety of tasks, including buoy placement, planting of adult clams in spawner sanctuaries and building a shellfish nursery system in East Islip, which later became the Town's shellfish hatchery.

However, Gregg's stay with Islip was a brief one. After less than a year, he signed on as an Aquaculture Specialist with Cornell Cooperative Extension of Suffolk County (CCE). Gregg, still with CCE, is now Director of the Suffolk County Marine Environmental Learning Center. The Center, located at Cedar Beach in Southold, New York – on the North Fork of Long Island – triples as a working shellfish hatchery, an operational base of bivalve and habitat restoration programs and an educational facility. On any given day, Gregg could deal with a very mixed menu of tasks, from tours, to problems keeping the Center's boats afloat and running, to assisting prospective shellfish farmers with permitting, to planting shellfish as part of an environmental restoration project. Plus, when he runs out of cool things to do, there's always the administrivia that comes with the job title, "Director".

Gregg says his education on Long Island, especially at MSRC, helped him make connections that he still uses everyday on the job. "I still keep in touch with many fellow alumni as well as professors and team up with both for grant-funded projects to help my clientele solve problems and help their businesses grow."

Profile, Lora M. Clarke, 2007



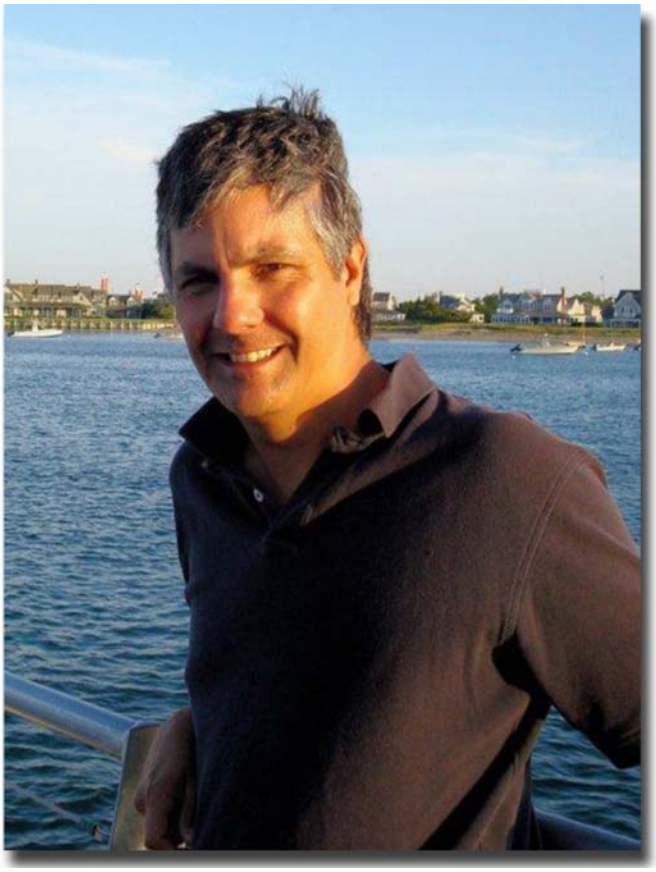
Lora Clarke received her Ph.D. from SoMAS in 2007. She also has a Bachelor of Science degree from Christopher Newport University in Virginia and a Master of Science from the University of Massachusetts. At SoMAS, she worked with former Dean David Conover on numerous fish ecology studies involving Atlantic silversides, *Menidia menidia*. Lora's research concentrated on the population dynamics and connectivity of subpopulations of this species along the east coast of the United States.

After she graduated, Lora was awarded a prestigious John A. Knauss Marine Policy Fellowship by NOAA in 2008 and began working with the NOAA Fisheries Office of Science and Technology in Silver Spring, Maryland, where she served as the Ecosystems Project Coordinator. Her duties included assisting Dr. Steve Murawski, then NOAA's Chief Scientist and Head of Scientific Programs, on programs related to ecosystem-based management. She also prepared international policy briefs and reports for Congress and helped administer CAMEO (Comparative Analysis of Marine Ecosystem Organization) – a new grant program co-sponsored by NOAA and the National Science Foundation.

After her one year fellowship ended, Lora was hired to stay on at NOAA to work on CAMEO. Currently, Lora develops goals and priorities for interdisciplinary ecosystem research, coordinates scientific review of research proposals and creates outreach plans to help promote the CAMEO program. In addition, Lora works with JSOST, the Joint Subcommittee for Ocean Science and Technology. JSOST is a group of 25 federal agencies organized under the White House Office of Science and Technology Policy that sets the national priorities for ocean science and technology research. Lora is one of two executive secretaries for the group.

Lora reflects on her SoMAS years…"The interdisciplinary nature of my education at SoMAS helped to prepare me for the work I am doing now and has helped to shape my career path. The breadth of courses, field work and lab experiences provided me with a strong well-rounded background in marine science and has allowed me to have the flexibility to pursue a career in science administration and policy. Working in internationally famous laboratories exposed me to leaders in the field and I was impressed by the willingness of faculty and students to collaborate with each other. This has helped me to successfully tackle the variety of marine ecosystem issues that I face in my job today. I am extremely thankful for my time at SoMAS."

Profile, Hans Dam, 1985 & 1989



Hans Dam attended SoMAS, known as the Marine Science Research Center (MSRC) at the time, for both his Master's and Doctoral degrees. After graduating from the University of Washington as an undergraduate in 1982, Hans came to Stony Brook to work with Dr. William Peterson. He received his MS in 1985, but stayed to work on his PhD with Dr. Peterson, finishing in 1989. During his time at the MSRC, Hans studied patterns of copepod abundance and grazing in Long Island Sound.

After leaving SoMAS, Hans spent a year as a post-doc at the University of Maryland's Horn Point Laboratory. He was hired as an assistant professor at the University of Connecticut in 1991 in both the Department of Marine Sciences and the Department of Ecology and Evolutionary Biology. He has been at UConn ever since, and is currently the Acting Head of the Department of Marine Sciences and the Acting Director of the Marine Science and Technology Center.

Hans's research interests include plankton ecology and evolution, the role of zooplankton in biogeochemical cycling and fluxes of organic matter. Much of his current research focuses on plankton communities in Long Island Sound, including monitoring zooplankton populations and examining how they can control harmful algal blooms and how they respond to projected changes in temperature in the Sound associated with climate change. Hans also investigates harmful algae such as Alexandrium and how grazers respond to these blooms. He is in charge of the process studies of LISICOS, the Long Island Sound Integrated Coastal Observing System (http://lisicos.uconn.edu/). Several faculty at UCONN are conducting studies dealing with the control of hypoxia in the Sound. The contribution of Hans' group to LISICOS is the study of downward fluxes of organic matter and grazing in elemental cycling in the Sound.

Hans reflects on his time studying marine sciences at Stony Brook: "At the risk of sounding corny, I am happy to say that my time at MSRC was one of the happiest ones. First, I had great teachers and mentors who helped me become a professional researcher, treated me with respect, and were extraordinarily generous with their time and their encouragement. Second, I also had great mates in my fellow students, some of whom have become life-long friends and colleagues. A great deal of what I am today, I owe to my years at MSRC."

Profile, Tim W. Davis, 2009

Tim Davis graduated from SoMAS in 2009 with his Ph.D. Before he came to SoMAS, Tim attended Southampton College of Long Island University, where he received his Bachelor of Science degree in marine science-biology. It was at Southampton that Tim first worked with Professor Chris Gobler investigating harmful algal blooms as an undergraduate. After taking a year off upon graduation, Tim decided to attend SoMAS so he could work with Gobler again. This time, Tim would be investigating the environmental factors that influence toxic and non-toxic strains of freshwater cyanobacterium, *Microcystis* spp., throughout the northeast USA.

For the past two years, Tim has been working as a Research Fellow with the Australian Rivers Institute at Griffith University where he investigated how different environmental factors promote the production of a toxin by a harmful algal species, *Cylindrospermopsis raciborskii*. He was recently awarded a prestigious Queensland Smart Futures Fellowship to use an advanced molecular technique to further investigate how toxic cyanobacteria communities respond to a changing climate. He is ever grateful for his time at SoMAS.

"I would highly recommend SoMAS to any student. There is always a wide range of exciting, cutting-edge research being conducted there," Tim writes. "The great interaction between faculty and students was invaluable to my research and their insights helped make my dissertation stronger."

Facilities and Infrastructure

New Marine Sciences Laboratory to be built at SoMAS Southampton

In 2009, $6.9 million was made available in the State University of New York (SUNY) capital budget for the construction of a new, state-of-the-art marine science laboratory at the site of the current Marine Station on the waterfront at Stony Brook Southampton. The present facilities are not adequate to support the explosive growth of SoMAS's undergraduate marine science and environmental science programs, which now enroll more than 500 students. Moreover, new facilities are needed to support cutting edge marine research of regional and national significance. On the drawing board is a 12,000 square foot facility providing space for expanded wet lab facilities, for aquaculture research, labs dedicated to use by graduate and undergraduate students, a marine instrumentation lab, offices and a space for public education and outreach. The lab will feature a modern, computer-operated running seawater system, analytical labs and equipment for use in research and teaching. The new building will replace several of the older buildings on the site of the present Marine Station. The expanded Marine Station will become the hub for waterfront recreation including diving and sailing programs as well as expanded programs for K-12 school groups, summer marine science camps, public lectures and education cruises on Shinnecock Bay. The marine laboratory will be LEEDS-certified.

Construction of the new laboratory at the Marine Station is projected to begin in early spring 2012 and to be completed in 18 months.

Flax Pond Marine Laboratory Greenhouse

In spring 2009, SoMAS and Stony Brook University proposed to replace the dilapidated greenhouse at the Flax Pond Laboratory. The previous greenhouse, which did not have sufficient temperature controls, had been erected in 1980. Over the decades, it suffered salt and wind corrosion as well as construction and storm damage. The SUNY Construction Fund in Albany authorized $350,000 for the new greenhouse project. After design work, and a prolonged period of delay, construction finally started in September 2011. In mid-December, SoMAS and the University's Office of Facilities Design and Engineering declared themselves satisfied with the finished product and the new greenhouse was ready for occupancy. The new greenhouse is roughly the same size as the old structure. However, its construction materials are designed to withstand the rigors of housing open seawater systems. The building is made with Kyrane-coated aluminum beams and 1" thick, twin-wall polycarbonate panels, with stainless steel fittings to help resist corrosion. The greenhouse itself sits atop a new masonry perimeter knee wall, with manually opening window vents. Perhaps the biggest improvement provided by the new greenhouse is in the area of temperature and humidity control. Automatic roof vents and circulation fans work together with a newly-installed heating system to provide good ambient air circulation and temperature control. The space will be fully usable on the coldest day of the winter and in the worst summer heat wave. New water-resistant fluorescent lighting and an adjustable interior shading system will accommodate projects requiring differential light regimes.

The new greenhouse currently has 6-foot diameter tanks plumbed for continuous seawater and air. The fiberglass external doors to the greenhouse are large enough to allow tanks up to 8 feet in diameter into the new structure, which are currently the largest single piece tanks at the Flax Pond facility. The new greenhouse at Flax Pond officially opened for research in January, 2012.

New Building on SBU Main Campus

Almost from its inception, SoMAS has been housed on the South Campus of Stony Brook University. While some have praised the relative isolation of this location, and the heightened sense of collegiality it may have engendered, being away from Main Campus is seen by others as, on balance, a detriment to the School. In this view, a Main Campus location would give SoMAS greater visibility, enhance collaborative interactions between SoMAS and other departments at the University and make it much easier on undergraduate students who are enrolled in SoMAS degree programs or who are just taking a course or two at the School.

The University's Master Plan calls for the consolidation of all academic units into the core of the Main Campus. In the fall of 2011, SoMAS was informed that it is scheduled for a new building to be constructed on Main Campus, with construction scheduled to start sometime in 2013 or soon thereafter. A tentative location has been determined. The new building will provide for a significant increase in the overall footprint/floor space available to SoMAS and will offer a unique opportunity to make major improvements to the scientific equipment and support infrastructure available to SoMAS faculty, staff and students.

The recent economic slowdown and attendant State budget problems have thrown the general timetable for the new SoMAS building into something of a limbo, but have not changed the decision to bring SoMAS to the Main Campus.

Awards and Honors

Each year, SoMAS confers a number of awards on undergraduate and graduate students in recognition of exceptional academic performance, extramural activities, and service to the SoMAS community. Additionally, MSRC faculty members regularly receive national and international recognition from professional and other societies for their scholarship and/or teaching excellence. Below is a list of awards to SoMAS students and faculty during the report period. Specific information on the student awards can be found on the SoMAS web site.

Undergraduate Student Awards

Evan R. Liblet Award
2010 – Deborah Aller
2011 – Eda Charmene Gimenez

Petra Udelhofen Memorial Scholarship
2010 – Deborah Aller
2011 – Eda Charmene Gimenez

Nathan L. Halpern Award
2010 – Michael White
2011 – Megan Bednarz

SoMAS Dean's Award
2011 – Nicholas Leonardo, Atmospheric and Ocean Sciences
– Michelle Ziegler, Marine Vertebrate Biology
– Karen Yee, Environmental Studies
– John Torelli, Marine Sciences

Undergraduate Research & Creativity Program Award
2010 – Seanna Forester

Graduate Student Awards

Evan R. Liblet Award
2010 – Cassandra Bauer
2011 – Konstantine Rountos

Professor Xiangding Wu Memorial Award
2010 – Parama Mukgherjee
2011 – Tingyin Xiao

Faculty and Staff Awards
2011 – Dr. Cindy Lee, G. Evelyn Hutchinson Award, American Society of Limnology & Oceanography

Recent Publications and Grants, SoMAS Faculty

SoMAS faculty are highly successful in securing external grant support and in publishing the results of their research in the peer-reviewed literature that is a key communications vehicle among scientists. The following list the publications and research grants of individual SoMAS faculty over calendar 2010 and 2011.

Bassem Allam

Publications

Rosa, M.E., J.E. Ward, S.E. Shumway, G.H. Wikfors, B.A. Holohan, E. Pales-Espinosa and B. Allam. 2011. The role of particle surface properties on feeding selectivity by Eastern oysters, *Crassostrea virginica*, and blue mussels, *Mytilus edulis*. *Journal of Shellfish Research* 30(2): 549-549.

Wang, K., M. Perrigault and B. Allam. 2011. Effects of temperature and QPX (Quahog Parasite Unknown) infection on the transcription of defense-related genes in the hard clam, *Mercenaria mercenaria*. *Journal of Shellfish Research* 30(2): 560-561.

Rubin, E., A. Tanguy, M. Perrigault and B. Allam. 2011. Virulence-related genes in QPX, the thraustochytrid parasite of the hard clam, *Mercenaria mecenaria*. *Journal of Shellfish Research* 30(2): 550-550.

Espinosa, E.P., X. Jing, M Perrigault and B. Allam. 2011. Mucosal C-type lectins in *Crassostrea virginica* and *Mytilus edulis*: potential involvement in particle capture and mucosal immunity. *Journal of Shellfish Research* 30(2): 503-503.

Dahl, S.F., M. Perrigault, Q.Liu, J.L. Collier, D.A. Barnes and B. Allam. 2011. Effects of temperature on hard clam (*Mercenaria mercenaria*) immunity and QPX (quahog parasite unknown) disease development: I. dynamics of QPX disease. J*ournal of Invertebrate Pathology* 106 (2): 314-321.

Perrigault, M., S.F. Dahl, E. Pales Espinosa, L. Gambino and B Allam. 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 (2): 322-332.

Jing, X., E. Pales Espinosa, M. Perrigault and B. Allam. 2011. Identification, molecular characterization and expression analysis of a mucosal C-type lectin in the eastern oyster, *Crassostrea virginica*. *Fish and Shellfish Immunology* 30 (3): 851-858.

Levinton, J., M. Doall, D. Ralston, A. Starke and B. Allam. 2011. Climate change, precipitation and the loss of an estuarine refuge. *PLoS One*. Published 28 Apr 2011 10.1371/journal.pone.0018849.

Pales Espinosa, E., M. Perrigault and B. Allam. 2010. Identification and molecular characterization of a mucosal lectin (MeML) from *Mytilus edulis* and its potential role in particle capture. *Comparative Biochemistry and Physiology* 156: 495-501.

Perrigault, M., D.M. Buggé and B. Allam. 2010. Effect of environmental factors on survival and growth of quahog parasite unknown (QPX) in vitro. *Journal of Invertebrate Pathology* 104: 83-89.

Dahl, S., J. Thiel and B. Allam. 2010. QPX disease progress in cultured and wild type hard clams in New York waters. *Journal of Shellfish Research* 29(1): 83-90.

Pales Espinosa, E., M. Perrigault, J.E. Ward, S. Shumway and B. Allam. 2010. Lectin binding patterns of microalgae: role in particle selection in suspension feeding bivalves. *Biological Bulletin* 218: 75-86.

Pales Espinosa E., D. Hassan, J.E. Ward, S.E. Shumway and B. Allam. 2010. Role of epicellular molecules in the selection of particles by the blue mussel, *Mytilus edulis*. *Biological Bulletin* 219 (1): 50-60.

Grants

$456,533 01 February 2011 to 31 January 2014 National Science Foundation *Host-Pathogen Interactions at Pallial Interfaces in Marine Bivalves: Cellular and Molecular Pathways for Host Colonization and Invasion*

$216,500 01 February 2011 to 31 January 2013 NOAA/New York Sea Grant *Development of Mitigation Strategies to Reduce the Impact of QPX disease on Hard Clam Transplant Fishery*

$278,144 01 September 2007 to 31 August 2010 National Science Foundation. *Separating the Grain from the Chaff: a Functional and Comparative Approach to Elucidate Particle Selection Mechanisms in Suspension-feeding Mollusks*

$215,962 01 February 2009 to 30 September 2011 NOAA/ New York Sea Grant *Functional Genomics Investigations of Hard Clam Immune Response and Resistance Against QPX Infection*

$200,000 01 March 2007 to 30 May 2010 NOAA/Rhode Island Sea Grant *Characterization of the Exoskeletal Microbial Communities and Host Immune Response Associated with Epizootic Shell Disease in Lobsters*

Josephine Aller

Publications

Alpert, P. A., J.Y. Aller and D.A. Knopf. 2011. Initiation of the ice phase by marine biogenic surfaces in supersaturated gas and supercooled aqueous phases. *Physical Chemistry Chemical Physics* 13(44): 19882-19894.

Knopf, D. A., P. A. Alpert, B. Wang and J. Y. Aller. 2011. Stimulation of ice nucleation by marine diatoms. *Nature Geoscience* 4:88–90 doi:10.1038/ngeo1037

Alpert, P.A., J.Y. Aller and D.A. Knopf. 2011. Ice nucleation from aqueous NaCl droplets with and without marine diatoms. *Atmospheric Chemistry and Physics* 11(12): 5539-5555.

Aller, J.Y., R.C. Aller, P.F. Kemp, A.Y. Chistoserdov and V.M. Madrid. 2010. Fluidized muds, a novel setting for the generation of biosphere diversity through geologic time. *Geobiology* 8: 169-178
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Cao, Z., Q. Zhu, R. C. Aller and J. Y. Aller. 2010. A fluorosensor for two-dimensional in situ measurements of extracellular enzyme activity in marine sediments. *Marine Chemistry* 123(1-4): 23-31.

Grants

$358,873. 01-Feb-2008 to 31-Jan-2012 National Science Foundation *REU Site: Research Experiences for Undergraduates in Marine and Atmospheric Processes*

$12,500. 01-Jun-2009 to 31-Oct-2012 Alfred and Jane Ross Foundation *The Alfred and Jane Ross Foundation Shearwater Grant Program to Encourage International Travel, Research and Understanding*

$129,819. 01-Aug-2011 to 31-Aug-2012 National Science Foundation *Optimizing RNA Binding and Detection for Use in the Capillary Waveguide Biosensor ESP Module in Preparation for Automated, in situ Microbial Process Studies*

Robert Aller

Publications

Soto-Neira, Q. Zhu and R.C. Aller. 2011. A new spectrophotometric method to quantify dissolved manganese in marine pore waters. *Marine Chemistry* 127 (1-4): 56-63.

Wang, D., R. C. Aller and S. Sanudo-Wilhelmy, 2011. Redox speciation and early diagenetic behavior of dissolved molybdenum in sulfidic muds. *Marine Chemistry* 125(1-4): 101-107.

Cao, Z.R., Q.Z. Zhu, R.C. Aller and J.Y. Aller. 2011. A fluorosensor for two-dimensional measurements of extracellular enzyme activity in marine sediments. *Marine Chemistry* 123(1-4): 23-31.

Fan, Y., Q. Zhu, R. C. Aller and D.C. Rhoads. 2011. An *in situ* multispectral imaging system for planar optodes in sediments: example high resolution seasonal patterns of pH. *Aquatic Geochemistry* 17(4-5): 457-471.

Zhu, Q., R. C. Aller and A. Kaushik. 2011. Analysis of vitamin B12 in seawater and marine sediment pore water using ELISA. *Limnology and Oceanography: Methods* 9: 515- 523.

Aller, R. C., V. Madrid, A.Y. Chistoserdov, J.Y. Aller and C. Heilbrun. 2010. Unsteady diagenetic processes and sulfur biogeochemistry in tropical deltaic muds: implications for oceanic isotope cycles and the sedimentary record. *Geochimica et Cosmochimica Acta* 74: 4671-4692.

Aller, J.Y., R. C. Aller, P.F. Kemp, A. Y. Chistoserdov and V.M. Madrid. 2010 Fluidized muds, a novel setting for the generation of biosphere diversity through geologic time. *Geobiology* 8: 169-178.

Zhu, Q. and R. Aller. 2010. A rapid response planar fluorosensor for 2-dimensional pCO2 distributions and dynamics in marine sediments. *Limnology and Oceanography Methods* 8: 326-336.

Grants

$997,600. 01-Apr-2009 to 31-Mar-2012 National Science Foundation *The Effects of Animal-Sediment Interactions on Biogeochemical Processes at the Sediment-Water Interface*

$471,594. 01-May-2011 to 30-Apr-2012 National Science Foundation *Early Diagenetic Aluminosilicate Formation and Burial of Biogenic Silica in Tropical Deltas*

Robert Armstrong

Publications

Saba V.S., M. A. M. Friedrichs, D. Antoine, R.A. Armstrong, I. Asanuma, M.J. Behrenfeld, A.M. Ciotti, M. Dowell, N. Hoepffner, K.J.W. Hyde, J. Ishizaka, T. Kameda, J. Marra, F. Melin, A. Morel, J. O'Reilly, M. Scardi, W.O. Smith, Jr., T.J. Smyth, S. Tang, J. Uitz, K. Waters and T.K. Westberry. 2011. An evaluation of ocean color model estimates of marine primary productivity in coastal and pelagic regions across the globe. 2011. *Biogeosciences* 8(2): 489-503.

Xue, J., C. Lee, S. Wakeham and R.A. Armstrong. 2011. Using principal components analysis (PCA) with cluster analysis to study the organic geochemistry of sinking particles in the ocean. *Organic Geochemistry* 42(4): 356-367.

Collier J.L., R. Lovindeer, Y. Xi, J.C. Radway and R. A. Armstrong. 2011. Differences in growth and physiology of marine *Synechococcus (*Cyanobacteria) on nitrate versus ammonium are not determined solely by nitrogen source redox state. *Journal of Phycology*. (in press)

Hannes Baumann

Publications

Baumann, H. and D.O. Conover. 2011. Adaptation to climate change: contrasting patterns of thermal-reaction-norm evolution in Pacific versus Atlantic silversides . *Proceedings of the Royal Society B-Biological Sciences* 278(1716): 2265-2273. DOI: 10.1098/rspb.2010.2479

Grants

$649,856 01-Sep-2011to- 31-Aug-2012 National Science Foundation *Will Rising PCO2 Levels in the Ocean Affect Growth and Survival of Marine Fish Early Life Stages?*

$14,800 24-Sep-2011 to 31-Mar-2012 NMFS Northeast Fisheries Science Center *Calibration of the Scale and Otolith Size Versus Fish Size Relationship for Georges Bank Haddock*

David Black

Publications

Neukom, R., J. Luterbach, R. Villalba, M. Kuttel, D. Frank, P. D. Jones, M. Grosjean, H. Wanner, J. – C. Aravena, D. E. Black, D. A. Christie, R. D'Arrigo, A. Lara, M. Morales, C. Soliz-Gamboa, A. Srur, R. Urrutia and L. von Gunten. 2010. Multiproxy summer and winter surface air temperature field reconstructions for southern South America covering past centuries, *Climate Dynamics* 37(1-2): 35-51. doi:10.1007/s00382-010-0793-3

Grants

$78,467 01-Oct-2010 to 30-Sep-2012 National Science Foundation *P2C2--Hydrological Variability During the Last Millennium from High Resolution Proxies*

$253,000 01-Aug-2009 to 31-Jul-2012 National Oceanic and Atmospheric Administration *High Resolution Tropical Atlantic SST Reconstructions of the Past 2000 Years*

$184,050 01-Jun-2011 to 31-May-2012 National Science Foundation *Acquisition of an Inductively Coupled Plasma Optical Emission Spectrometer for Multidisciplinary Research and Education*

$1,597,059 01-Apr-2011 to 31-Mar-2012 National Science Foundation *Do Interactions Between Vertically and Horizontally Transported Particles Measurably Affect Particle Composition and Flux to the Sediments? A Mechanistic Approach*

$168,414 01 December 2006 to 31 August 2010 National Science Foundation *Establishment of a Climate-type Section for the Tropical Atlantic from Cariaco Basin Sediments*

$157,619 15 August 2008 to 31 January 2010 National Science Foundation *Testing Methods for Direct Measurement of Particle Settle Velocities and Fluxes in the Sea*

Henry Bokuniewicz

Publications

Buonaiuto, F.S., M. Slattery and H.J. Bokuniewicz. 2011. Wave modeling of Long Island coastal waters. *Journal of Coastal Research* 27(3): 470-477.

Bokuniewicz, H.J., N.C. Kraus, S. Munger, M. Slattery and R. Coffey. 2011. Monitoring incipient breaching at an artificial inlet: Georgica Pond, New York. *Journal of Coastal Research*: Special Issue 59 - Proceedings, Symposium to Honor Dr. Nicholas Kraus [Roberts, Rosati & Wang], pp. 111 – 117. doi: 10.2112/SI59-011.1

Rapaglia, J., L. Zaggia, K. Ricklefs, M. Gelinas and H.J. Bokuniewicz. 2011. Characteristics of ships' depression waves and associated sediment resuspension in Venice Lagoon, Italy. *Journal of Marine Systems* 85(1-2): 45-56.

Basterretxea G., A. Tovar-Sanchez, A. J. Beck, P. Masqué, H. J. Bokuniewicz, R. Coffey, C. M. Duarte, J. Garcia-Orellana, E.Garcia-Solsona, L. Martinez-Ribes and R. Vaquer-Sunyer. 2010. Submarine groundwater discharge to the coastal environment of a Mediterranean island (Majorca, Spain): ecosystem and biogeochemical significance. *Ecosystems*: *DOI: 10.1007/s10021-010-9334-5*

Rapaglia J., E. Di Sipio, H. Bokuniewicz, G. M. Zuppi, L. Zaggia, A. Galgaro and A. Beck. 2010. Groundwater connections under a barrier beach: a case study in the Venice Lagoon. *Continental Shelf Research* 30 (2010) 119–126 DOI: 10.1016/j.csr.2009.10.001.

Grants

$69,963 01-Aug-2008 to 31-Jul-2013 US Geological Survey *Discharge of Nutrients to Coastal Waters of Long Island Via Submarine Groundwater Discharge*

$122,000 01-Jan-2010 to 15-Jul-2012 Suffolk County Water Authority *Groundwater Research and Education Research*

$61,817 01 June 2009 – 31 August 2010 U.S. Army Corps of Engineers *Long Island Regional Sediment Management: Coastal Planning Project*

$40,150 06 July 2010 to 30 November 2010 National Park Service *Regional Sediment Planning: Long Island Coastal Planning Project: Project Delivery Team Meetings and a Stakeholders Workshop*

Malcolm Bowman

Publications

Rosensweig, C., W. D. Solecki, R. Blake, M. Bowman, C. Faris, V. Gornitz, R. Horton, K. Jacob, A. LeBlanc, R. Leichenko, M. Linkin, D. Major, M.O'Grady, L. Patrick, E. Sussman, G. Yohe and R Zimmerman. 2011. Developing coastal adaptation to climate change in the New York City infrastructure-shed: process, approach, tools, and strategies. *Climatic Change* (Special Issue SI) 106(1): 93-127.

Horton, R., V. Gornitz, M. Bowman and R. Blake. 2010. Chapter 3. Climate Observations and Projections. Pages 41-62 in, C. Rosenzsweig and W. Solecki (eds.) *Climate Change Adaptation in New York City: Building a Risk-Management Response, New York Panel on Climate Change, Annals of the New York Academy of Sciences,* Vol. 1196, 354 p.

Korotenko, K.A., M.J. Bowman and D.E. Dietrich. 2010. Tracking and predicting the Gulf oil spill plumes. *Journal of Cosmology* 8: 2023-2025.

Korotenko, K.A., M.J. Bowman and D.E. Dietrich. 2010. High-resolution numerical model for predicting the transport and dispersal of oil spilled in the Black Sea. 2010. *Terrestrial, Atmospheric and Ocean Sciences,* 21(1): 110-123.

Bruce Brownawell

Publications

Lara-Martin, P. A., E. Gonzalez-Mazo and B.J. Brownawell. 2011. Multi-residue method for the analysis of synthetic surfactants and their degradation metabolites in aquatic systems by liquid chromatography-time-of-flight-mass spectrometry. *Journal of Chromatography* A 1218(30): 4799-4807.

Li, X. and B.J. Brownawell. 2011. Quaternary ammonium compounds in urban estuarine sediment environments - a class of contaminants in need of increased attention? *Environmental Science & Technology* 44(19): 7561-7568. DOI: 10.1021/es1011669

Lara-Martin, P.A., X. Li, R.F. Bopp and B.J. Brownawell. 2010. Occurrence of alkyltrimethylammonium compounds in urban estuarine sediments: behentrimonium as a new emerging contaminant source. *Environmental Science & Technology* 44(19): 7569-7575. DOI: 10.1021/es101169a

Swanson R.L., B. Brownawell, R.E. Wilson and C. O'Connell C. 2010. What history reveals about Forge River pollution on Long Island, New York's south shore. *Marine Pollution Bulletin* 60: 804-818.

Cohn C.A., S.C. Fisher, B.J. Brownawell and M.A.A. Schoonen. 2010. Adenine oxidation by pyrite-generated hydroxyl radicals. *Geochemical Transactions* 11(2): 1-8.

Grants

$640,911 01 June 2006 to 31 May 2010 National Institute of Environmental Health Sciences *Sources, Fate and Identification of Endocrine Disruption Compounds in the Hudson*

Robert Cerrato

Publications

Nuttall, M. A., A. Jordaan, R.M. Cerrato and M.G. Frisk. 2011. Identifying 120 years of decline in ecosystem structure and maturity of Great South Bay, New York using the Ecopath modelling approach. *Ecological Modelling* 222(18): 3335-3345. DOI: 10.1016/j.ecolmodel.2011.07.004

Sagarese, S.R., R.M. Cerrato and M.G. Frisk. 2011. Diet composition and feeding habits of common fishes in Long Island Bays, New York. *Northeastern Naturalist* 18: 291-314.

McNamara, M.E., D.J. Lonsdale and R.M. Cerrato. 2010. Shifting abundance of the ctenophore *Mnemiopsis leidyi* and the implications for larval bivalve mortality. *Marine Biology* 157(2): 401-412.

Grants

$650,000 October 2007 – August 2011 New York State Department of State *Great South Bay Ecosystem and Modeling Study*

Edmund K.M. Chang

Publications

Chang, E.K. M. and Y. Guo. 2011. Comments on "The source of the midwinter suppression in storminess over the North Pacific". *Journal of Climate* 24(19): 5187-5191. DOI: 10.1175/2011JCLI3987.1

Chang, E. K. M. and W. Lin. 2011: Comments on "The role of the Central Asian Mountains on the midwinter suppression of North Pacific Storminess". *Journal of Atmospheric Sciences* 68(11): 2800–2803. doi: http://dx.doi.org/10.1175/JAS-D-11-021.1

Grants

$445,579 01-May-2008 to 30-Apr-2012 National Science Foundation *Dynamics of Interactions between Wave Packets and Explosive Cyclogenesis Over Western North Pacific*

$393,120 01 June 2006 to 31 May 2011 NOAA *Storm Track Variability and Change under Global Warming*

Damien Chapman

Publications

Fitzpatrick, S., M.S. Shivji, D.D. Chapman and P.A. Prodöhl. 2011. Development and characterization of 10 polymorphic microsatellite loci for the blue shark, *Prionace glauca*, and their cross shark-species amplification. *Conservation Genetics Resources* 3(3): 523-527. DOI: 10.1007/s12686-011-9395-6

Doukakis, P., B. Hanner, M. Shivji, C. Bartholomex, D.D. Chapman, E. Wong and G. Amato. 2011. Applying genetic techniques to study remote shark fisheries in northeastern Madagascar. *Mitochondrial* DNA. DOI: 10.3109/19401736.2010.526112

Benavides, M.T., K.A. Feldheim, C.A. Duffy, S. Wintner, M. Braccini, J. Boomer, C. Huveneers, P. Rogers, J.C. Mangel, J. Alfaro-Shigueto, D.P. Cartamil and D.D. Chapman. 2011. Phylogeography of the copper shark (*Carcharhinus brachyurus*) in the Southern Hemisphere: implications for the conservation of a coastal apex predator. *Marine and Freshwater Research*. (in press)

Benavides, M.T., R.L. Horn, K.A Feldheim, M.S. Shivji, S.C. Clarke, S. Wintner, L. Natanson, M. Braccini, J. Boomer, S.J.B Gulak and D.D. Chapman. 2011.Global phylogeography of the dusky shark, *Carcharhinus obscurus*: implications for fisheries management and monitoring the shark fin trade. *Endangered Species Research*. (in press)

Chapman, D.D., C.A. Simpendorf, T.R. Wiley, G.R. Poulakis, M. Trigali, C. Curtis, J. Carlson and K.A. Feldheim. Genetic diversity despite population collapse in an endangered sawfish: *Pristis pectinata*. (Accepted: *Journal of Heredity*).

Feldheim, K.A., D.D. Chapman, D. Sweet, S. Fitzpatrick, P.A. Prodohl, M.S. Shivji and B. Snowden. 2010. Shark virgin birth produces multiple, viable offspring. *Journal of Heredity* 101(3): 374-377.

Feldheim, K.A., D.D. Chapman et al. 2010. Genetic tools to support the conservation of the endangered smalltooth sawfish, *Pristis pectinata*. *Conservation Genetics Resources* DOI 10.1007/s12686-010-9175.

Grants

$162,500 20-Oct-2009 to 31-Oct-2012 Pew Charitable Trusts *Conservation Genetics of a Large Coastal*

$65,135 05-May-2011 to 04-May-2014 Earthwatch *Conservation of Threatened Sharks on the Belize Barrier Reef*

$34,100 31-Aug-2011 to 30-Jun-2012 National Oceanic and Atmospheric Administration *Silverside Genetics*

J. Kirk Cochran

Publications

Schmidt, S. and J. K. Cochran. 2010 Radium and radium-daughter nuclides in carbonates: a brief overview of strategies for determining chronologies. *Journal of Environmental Radioactivity* 101(7): 530-537.

Cochran, J. K., K. Kallenberg, N. H. Landman, P. J. Harries, D. Weinreb, K. K. Turekian, A. J. Beck and W. A. Cobban. 2010. Effect of diagenesis on the Sr, O, and C isotope composition of Late Cretaceous mollusks from the Western Interior Seaway of North America. *American Journal of Science* 310(7): 69-88.

Garcia-Orellana, J., J. K. Cochran, H. Bokuniewicz, S. Yang and A. Beck. 2010. Time-series sampling of ^{223}Ra and ^{224}Ra at the inlet to Great South Bay (New York): a strategy for characterizing the dominant terms in the Ra budget of the bay. *Journal of Environmental Radioactivity* 101(7): 582-588.

Cámara-Mor, P., P. Masqué, J. Garcia-Orellana, J. K. Cochran, J. L. Mas, E. Chamizo and C. Hanfland. 2010. Arctic Ocean sea ice drift origin derived from artificial radionuclides. *Science of the Total Environment* 408(16): 3349-3358.

Beck, A. J., J. K. Cochran and S. A. Sañudo-Wilhelmy. 2010. The distribution and speciation of dissolved trace metals in a shallow subterranean estuary. *Marine Chemistry* 121: 145-156.

Saari, H.-K., S. Schmidt, P. Castaing, G. Blanc, B. Sautour , O. Masson and J. K. Cochran. 2010. The particulate ^{7}Be/^{210}Pb$_{xs}$ and ^{234}Th/^{210}Pb$_{xs}$ activity ratios as tracers for tidal-to-seasonal particle dynamics in the Gironde estuary (France): implications for the budget of particle-associated contaminants. *Science of the Total Environment* 408(20): 4784-4794.

Kolker, A.S., M. L. Kirwan, S. L. Goodbred and J. K. Cochran. 2010. Global climate changes recorded in coastal wetland sediments: empirical observations linked to theoretical predictions. *Geophysical Research Letters* 37, L14706, doi:10.1029/2010GL043874.

Grants

$10,000 30-Aug-2011 to 31-Oct-2013 National Park Service *Using Naturally Occurring Radium Isotopes*

$78,899 29-Jul-2010 to 30-Jun-2013 National Park Service *Is Nitrogen a Cause of Marsh Loss in*

$1,200,000 01-Apr-2010 to 31-Mar-2012 National Science Foundation *Acquisition of Mass Spectrometers for Earth Systems Science Research at Stony Brook University*

$36,120 01 February 2009 to 31 January 2010 National Science Foundation *Acquisition/Upgrade of Alpha Spectromoetry Facility*

$399,313 15 August 2005 to 31 August 2010 National Science Foundation *Carbon Cycling in the Circumarctic Flaw Lead-Polyna System – A Radionuclide and Molecular Ecological Approach*

Brian Colle

Publications

Murray, J.C. and B.A. Colle. 2011. The spatial and temporal variability of convective storms over the northeast United States during the warm season. *Monthly Weather Review* 139(3): 992-1012.

Lin, Y.L., L.I. Donner and B.A. Colle. 2011. Parameterization of riming intensity and its impact on ice fall speed using ARM data. *Monthly Weather Review* 139(3): 1036-1047.

Lin, Y.L. and B.A. Colle. 2011. A new bulk microphysical scheme that includes riming intensity and temperature-dependent ice characteristics. *Monthly Weather Review* 139(3): 1013-1035.

Colle, B.A. and M.E. Charles. 2011. Spatial distribution and evolution of extra-tropical cyclone errors over North America and its adjacent oceans in the NCEP Global Forecast System Model. *Weather and Forecasting*. 26(2): 129-149.

Yuter, S.E., D.A. Stark, J.A. Crouch, M.J. Payne and B. A. Colle. 2011. The impact of varying environmental conditions on the spatial and temporal patterns of orographic precipitation over the Pacific Northwest near Portland, Oregon. *Hydrometeorology* 12(3): 329-351.

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Willett, K., F. Pimenta, D. Veron and B. Colle. 2010. Electric power from offshore wind via synoptic-scale interconnection. *Proceedings of the National Academy of Sciences*, doi:10.1073/pnas.0909075107.

Colle, B. A., K. Rojowsky and F. Buonaiuto. 2010. New York City storm surges: climatology and analysis of the wind and cyclone evolution. *Journal of Applied Meteorology and Climatology* 49(1): 85-100.

Grants

$296,811 01-Sep-2009 to 31-Aug-2012 National Science Foundation *Intermittent and Steady State Processes in Orographic Precipitation*

$180,018 01-Aug-2011 to 31-Jul-2012 National Oceanic and Atmospheric Administration Prediction, *Validation, and Calibration of Coastal Storms and Associated High Impact Weather in Ensemble Regional Climate Simulations Over the Northeast U.S.*

$184,040 24-Jul-2008 to 15-Jul-2012 USDA Forest Service *Employing Mesoscale Ensemble Weather Predictions to Enhance Fire Weather Forecasting Over the Northeast U.S.*

$226,158 01-May-2010 to 30-Apr-2012 National Oceanic and Atmospheric Administration *Predictability of High Impact Weather During the Cool Season Over the Eastern U.S: From Model Assessment to the Role of the Forecaster*

$54,850 30-Sep-2011 to 31-Dec-2011 US Department of Energy *Improving Atmospheric Models for Offshore Wind Resource Mapping and Prediction Using Lidar, Aircraft, and In-Ocean Observations*

$225,840 01-Jun-2007 to 30-Nov-2011 National Science Foundation *Impact of Terrain, Land-sea Boundaries, and Urban Areas on Convective Initiation, Structure, and Evolution Over the Northeast United States*

$78,202 01 September 2007 to 28 February 2010 University Corporation for Atmospheric Research *Use of Mesoscale Ensemble Weather Predictions to Improve Short-term Precipitation and Hydrological Forecasts*

$136,154 01 May 2008 to 31 December 2011 NYSERDA Improving Air Quality *Forecasting and Management in NY State through Ensemble and High Resolution Modeling and Diagnostic Analysis*

$157,702, 01 February 2011 to 31 January 2013 NOAA/New York Sea Grant *Future Changes in East Coast Storms and Its Impact on Coastal Inundation and Long Island Sound Mixing*

Jackie Collier

Publications

Collier, J.L., J.C. Radway, Y Liu and N. Liu. 2011. Cultivated and cultivation-independent diversity of fungus-like marine protists, the Labyrinthulomycetes. *Journal of Phycology* 47 (Special Issue, Supplement 2): S46-S47.

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Collier J.L., R. Lovindeer, Y. Xi, J.C. Radway and R. A. Armstrong. 2011. Differences in growth and physiology of marine *Synechococcus* (Cyanobacteria) on nitrate versus ammonium are not determined solely by nitrogen source redox state. *Journal of Phycology.* (in press)

Gobler, C.J., D.L. Berry, S.T. Dyhrman, S.W. Wilhelm, A. Salamov, A.V. Lobanov, Y. Zhang, J.L. Collier, L.L. Wurch, A.B. Kustka, B.D. Dill, M. Shah, N.C. VerBerkmoes, A. Kuo, A. Terry, J. Pangilinan, E.A. Lindquist, S. Lucas, I.T. Paulsen, T.K. Hattenrath-Lehmann*, S.C. Talmage*, E.A. Walker*, F. Koch*, A.M. Burson*, M.A. Marcoval, Y.Z. Tang, G.R. LeCleir, K.J. Coyne, G.M. Berg, E.M. Bertrand, M.A. Saito, V.N. Gladyshev, I.V. Grigoriev. 2011. Niche of harmful alga *Aureococcus anophagefferens* revealed through ecogenomics. *Proceedings of the National Academy of Sciences* 108(11): 4352-4357. (doi: 10.1073/pnas.1016106108)

Solomon, C.M., J.L. Collier, G.M. Berg and P.M. Glibert. 2010. Role of urea in microbial metabolism in aquatic systems: a biochemical and molecular review. *Aquatic Microbial Ecology* 59(1): 67-88.

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(3): 215-228.

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$353,866 01-Sep-2007 to 31-Aug-2012 National Science Foundation *Labyrinthulomycete Diversity and Abundance*

$205,310 01 April 2009 to 31 August 2011 New York Sea Grant Managing BrownTide: *Nitrogen Physiology of Aureococcus anophagefferens within the Plankton Community Context*

$213,000 01 April 2009 to 31 August 2011 New York Sea Grant *Functional Genomics Investigations of Hard Clam Immune Response and Resistance against QPX*

David Conover

Publications

Baumann, H. and D.O. Conover. 2011. Adaptation to climate change: contrasting patterns of thermal-reaction-norm evolution in Pacific versus Atlantic silversides . *Proceedings of the Royal Society B-Biological Sciences* 278(1716): 2265-2273. DOI: 10.1098/rspb.2010.2479

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Clarke, L.M., S.R. Thorrold and D.O. Conover. 2011. Population differences in otolith chemistry have a genetic basis in *Menidia menidia*. *Canadian Journal of Fisheries and Aquatic Sciences*. 68(1): 105-114. 2011

Pugh, G. and D.O. Conover. 2011. NSF: Advancing Basic Ocean Research and Infrastructure. *Sea Technology*. 52(1):

Grants

$860,684 01 January 2005 to 31 March 2011 National Science Foundation *Local Adaptation Across Latitudes: Spatial Scales, Gene Flow and Correlates of Countergradient Growth Variations*

Nicholas Fisher

Publications

Dutton, J. and N.S. Fisher. 2011. Salinity effects on the bioavailability of aqueous metals for the estuarine killifish *Fundulus heteroclitus*. *Environmental Toxicology and Chemistry* 30(9): 2107-2114. DOI: 10.1002/etc.600

Dutton, J. and N.S. Fisher. 2011. The bioaccumulation of As, Cd, Cr, Hg, and MeHg in the killifish (*Fundulus heteroclitus*) from worm and amphipod prey. *Science of the Total Environment* 409(18): 3438-3447.

Baumann, Z. and N.S. Fisher. 2011. Modeling metal bioaccumulation in a deposit-feeding polychaete from labile sediment fractions and from pore water. *Science of the Total Environment* 409(13): 2607-2615.

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Fisher, N.S., and K.O. Buesseler. 2011. Tracking Fukushima radionuclides: a research cruise in Japanese waters. *Bulletin of Atomic Scientists*. http://www.thebulletin.org/web_edition/roundtables/fukushima_what_dont_we_know .

Peng, X., S. Palma, N.S. Fisher and S.S. Wong. 2011. Effect of morphology of ZnO nanostructures on their toxicity to marine algae. *Aquatic Toxicology* 102(3-4): 186-196.

Chen, X., S.B. Baines and N.S. Fisher. 2011. Can copepods be limited by the iron content of their food? *Limnology and Oceanography* 56(2): 451-460.

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Baines, S.B., B.S. Twining, S. Vogt, W.M. Balch, N.S. Fisher and D.M. Nelson. 2011. Elemental composition of equatorial Pacific diatoms exposed to additions of silicic acid and iron. *Deep-Sea Research II* 58(3-4): 512-523.

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Stewart, A.R., M. Grosell, D. Buchwalter, N.S. Fisher, S.N. Luoma, T. Mathews, P. Orr and W.-X. Wang. 2010. Bioaccumulation and trophic transfer of selenium. In P.M. Chapman, W.J. Adams, M.L. Brooks, C.G. Delos, S.N. Luoma, W.A. Maher, H.M. Ohlendorf, T.S. Presser,and D.P. Shaw (eds.) *Ecological Assessment of Selenium in the Aquatic Environment*, , CRC Press, Pensacola, FL, 93-139, 368p.

Fisher, N.S., T. Mathews and J. Dutton. 2010. Dietary sources dominate metal uptake in marine fish. *Rapp. Comm. Int. Mer Medit.* 39: 251.

Williams, J.J., J. Dutton, C.Y. Chen and N.S. Fisher. 2010. Metal (As, Cd, Hg, and CH_3Hg) bioaccumulation from water and food by the benthic amphipod *Leptocheirus plumulosus. Environmental Toxicology and Chemistry* 29(8): 1755-1761.

Dutton, J. and N.S. Fisher. 2010. Intraspecific comparisons of metal bioaccumulation in the juvenile Atlantic silverside *Menidia menidia. Aquatic Biology* 10(3): 211-226.

Baines, S.B., B.S. Twining, M.A. Brzezinski, D.M. Nelson, and N.S. Fisher. 2010. The causes and biogeochemical implications of regional differences in silicification of marine diatoms. *Global Biogeocheical Cycles.* doi:10.1029/2010GB003856.

Karimi, R., N.S. Fisher, and C.L. Folt. 2010. Multi-element stoichiometry in aquatic animals: when growth dilution matters. *American Naturalist* 176: 699-709. doi:: 10.1086/657046.

Grants

$250,030 11-Aug-2009 to 10-Aug-2012 NYS Energy Research and Development *Authority Geographic Variation of Methylimercury Bioaccumulation in the Hudson*

$199,998 01-May-2011 to 30-Apr-2
012 Woods Hole Oceanographic Institution *Radioecological Studies Involving Radionuclides Released by the Fukushima Nuclear Reactor*

$301,308 01-Apr-2010 to 31-Dec-2012 Stony Brook Foundation *Gelfond Fund for Research*

$601,327 28 June 2006 to 30 September 2011 Dartmouth College *Biological Processes Affecting Bioaccumulation, Transfer and Toxicity of Metal Contaminants in Estuarine Sediments*

$1,383,176 24 April 2006 to 07 December 2011 U.S. Army Humphreys Engineer Center *An Integrated Field and Laboratory Study of Bioavailability of Metal Contaminants in Sediments*

Charles Flagg

Publications

Wang, D-P., C.N.Flagg, K. Donohue and H.T. Rossby. 2011. Wavenumber spectrum in the Gulf Stream from shipboard ADCP observations and comparison with altimetry measurements. *Journal of Physical Oceanography* 40(4): 840-844 DOI: 10.1175/2009JPO4330.1

Grants

$280,725 01-Sep-2008 to 31-Aug-2012 National Science Foundation *The Oleander Project: Sustained Observations Between New York and Bermuda*

$133,342 08-Jun-2011 to 31-Jul-2012 National Science Foundation The Norrona Project: *An International Collaboration for Sustained Studies of the Meridional Overturning Circulation Between Denmark, the Faroes and Iceland*

$55,652 15 April 2006 to 31 March 2010 National Science Foundation *Processes Controlling Abundance of Dominant Copepod Species on Georges Bank*

$494,198 01 July 2005 to 28 February 2011 National Science Foundation *The Norrona Project: an International Collaboration for Sustained Studies of the Meridional Overturning Circulation Between Denmark, the Faroes and Iceland*

Roger Flood

Publications

Parsons, D.R., J. Peakall, A.E. Aksu, R.D. Flood, R.N. Hiscott, S. Besiktepe and D. Mouland. 2010. Gravity-driven flows in a submarine channel bend: direct field evidence of helical flow reversal. *Geology* 38: 1063-1066.

Grants

$32,579 01-Oct-2009 to 13-Apr-2012 Fugro Earth Data, Inc. *Shallow-water Bathymetry of the Hudson River*

$249,818 01-Mar-2007 to 31-Dec-2010 Suffolk County Health Services *Benthic Mapping and Habitat Classification in the Peconic Estuary, Phase III*

$131,895 09-Jun-2008 to 30-Jun-2010 National Park Service *High-Resolution Bathymetric and Backscatter Mapping in Gateway National Recreation Area (Component A and B)*

Michael Frisk

Publications

Nuttall, M. A., A. Jordaan, R.M. Cerrato and M.G. Frisk. 2011. Identifying 120 years of decline in ecosystem structure and maturity of Great South Bay, New York using the Ecopath modelling approach. *Ecological Modelling* 222(18): 3335-3345. DOI: 10.1016/j.ecolmodel.2011.07.004

Frisk, M.G., T.J. Miller, R.J. Latour and S. J. D. Martell. 2011. Assessing biomass gains from marsh restoration in Delaware Bay using Ecopath with Ecosim. *Ecological Modelling* 222(1):190-200.

Frisk, M.G., D.E. Duplisea and V.M. Trenkel. 2011. Exploring the occupancy-abundance relationships for the Georges Bank finfish and shellfish community from 1963-2006. *Ecological Applications* 21(1): 227-240.

Hall, C.J., A. Jordaan, and M.G. Frisk. 2011. The historic influence of dams on diadromous fish habitat with a focus on river herring and hydrologic connectivity. *Landscape Ecology* 26(1):95-107.

Dunton, K.J. A. Jordaan, D.O. Conover, K.A. McKown, and M.G. Frisk. 2010. Abundance and distribution of Atlantic Sturgeon (*Acipenser oxyrinchus*) within the Atlantic Ocean inferred from spatial and habitat analyses of five fishery independent surveys. *Fishery Bulletin* 108(4) pp. 450-465.

Sagarese, S.R. and M.G. Frisk. 2010. An investigation on the effect of photoperiod and temperature on vertebral band deposition in little skate, *Leucoraja erinacea*. *Journal of Fish Biology* 77(4): 935-946.

Frisk, M.G., S.J.D. Martell, T.J. Miller and K. Sosebee. 2010. Exploring the population dynamics of winter skate (*Leucoraja ocellata)* in the Georges Bank region using a statistical catch-at-age model incorporating length, migration and recruitment process errors. *Canadian Journal of Fisheries and Aquatic Sciences* 67(5): 774-792.

Frisk, M.G. 2010. Life History Strategies of Batoids. Pages 283-318 In: J.C. Carrier, J.A. Musick and M.R Heithaus (eds.), *Sharks and Their Relatives II: Biodiversity; Adaptive Physiology and Conservation.* CRC Press, 736p.

Grants

$234,596 01-Jun-2010 to 31-May-2012 National Oceanic and Atmospheric Administration *Restoring Long Island's Winter Flounder Fishery: Influence of Natural and Anthropogenic Factors on Health, Fitness and Recruitment Success*

$140,525 01-Aug-2010 to 31-Jul-2012 National Science Foundation *Patterns of Connectivity in Northwest Atlantic Fishery Ecosystems*

$16,000 01-Aug-2010 to 31-Jul-2011 Hudson River Foundation *Graduate Support for K. Dunton: Population Dynamics and Development of an Effective Area-Based Management Scenario to Reduce Bycatch, Conserve and Improve the Population Status of Atlantic Sturgeon*

Marvin Geller

Publications

Geller, M.A., T.H. Zhou, R. Ruedy, I. Aleinov, L. Nazarenko, N.L. Tausnev, S. Sun, M. Kelley and Y. Cheng. 2011. New gravity wave treatments for GISS climate models. *Journal of Climate* 24(15): 3989-4002. DOI: 10.1175/2011JCLI4013.1

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Geller, M. A. and J. Gong. 2010: Gravity wave kinetic, potential, and vertical fluctuation energies as indicators of different frequency gravity waves, *Journal of Geophysical Research* 115, D11111, doi:10.1029/2009JD012266.

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Grants

$219,291 01-Apr-2008 to 14-Jul-2012 NASA *Gravity Wave Parameterization in GISS Climate Models*

$383,294 01-Dec-2008 to 30-Nov-2012 National Science Foundation *The Quasi-Biennial Oscillation (QBO) and Tropical Deep Convection*

$183,980 01-Jun-2011 to 31-Jul-2012 National Science Foundation *High-Resolution Radiosonde Data, Gravity Waves, Turbulence, and the Extratropical Tropopause*

$812,341 01 August 2004 – 31 July 2010 National Science Foundation *United States High-vertical Resolution Radiosonde Data Analysis for Gravity Waves and Tropopause Processes and Dissemination to the Science Community*

$382,915 01 September 2007 to 28 February 2011 NASA *The SPARC Data Center and QBO Impacts on tropical Convective Systems*

Christopher Gobler

Publications

Talmage, S.C. and C.J. Gobler. 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* 6(10) Article: e26941 DOI: 10.1371/journal.pone.0026941

Tang, Y.Z. and C.J. Gobler. 2011. The green macroalga, *Ulva lactuca*, inhibits the growth of seven common harmful algal bloom species via allelopathy. *Harmful Algae* 10(5): 480-488 DOI: 10.1016/j.hal.2011.03.003

Harke, M.J., C.J. Gobler and S.E. Shumway. 2011. Suspension feeding by the Atlantic slipper limpet (*Crepidula fornicata*) and the northern quahog (*Mercenaria mercenaria*) in the presence of cultured and wild populations of the harmful brown tide alga, *Aureococcus anophagefferens*. *Harmful Algae* 10(5): 503–511.

Koch, F., M.A. Marcoval, C. Panzeca, K.W. Bruland, S.A. Sañudo-Wilhelmy and C. J. Gobler. 2011. The effect of vitamin B-12 on phytoplankton growth and community structure in the Gulf of Alaska. *Limnology and Oceanography* 56(3): 1023-1034.

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Tang, Y.Z. and C.J. Gobler. 2011. Allelopathic effects of the green macroalgae, *Ulva lactuca*, on seven common harmful algal bloom species. *Harmful Algae* 10(5): 480–488.

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Goleski, J.A., F. Koch, M.A. Marcoval, C.C. Wall, F.J. Jochem, B.J. Peterson and C.J. Gobler. 2010. The role of zooplankton grazing and nutrient loading in the occurrence of harmful cyanobacterial blooms in Florida Bay, USA . *Estuaries and Coasts* 33(5): 1202-1215 DOI: 10.1007/s12237-010-9294-1

Jiang, X., D.J. Lonsdale and C.J. Gobler. 2010. Density-dependent nutritional value of the dinoflagellate *Cochlodinium polykrikoides* to the copepod *Acartia tonsa*. *Limnology and Oceanography* 55(4): 1643–1652.

Hattenrath, T.K., D.A. Anderson and C.J. Gobler. 2010. The influence of anthropogenic nitrogen loading and meteorological conditions on the dynamics and toxicity of *Alexandrium fundyense* blooms in a New York (USA) estuary. *Harmful Algae* 9(4): 402–412.

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Grants

$260,865 01-Mar-2006 to 30-Sep-2013 Suffolk County Health Services C*auses, Effects, Dynamics, and Distribution of Cochlodinium Polykrikoides Blooms and Cells in the Peconic Estuary, Suffolk County, NY*

$640,000 01-Jan-2010 to 31-Dec-2012 Renaissance Charitable Foundation, Inc. *Southampton Coastal and Estuarine Research Program (SCERP)*

$285,895 01-Sep-2010 to 31-Aug-2012 National Oceanic and Atmospheric Administration *ECOHAB: Establishing the Sources of Phosphorus Promoting Toxic Cyanobacteria Blooms in the US Great Lakes Using Gene Expression Assays*

$117,844 01-Sep-2011 to 31-Aug-2012 National Oceanic and Atmospheric Administration *MERHAB: Monitoring, Forecasting, and Enhanced Response to PSP and DSP Events in New York Coastal Waters*

$16,886 01-May-2011 to 30-Apr-2012 Peconic Land Trust 2011 *Study of Lake Agawam Conservation Association*

$28,900 01-Sep-2009 to 14-Mar-2012 Southampton Town Trustees 2009 *Study of Mill Pond for the Southampton Town Trustees*

$171,064 01-Mar-2010 to 28-Feb-2012 National Fish and Wildlife Foundation *The Effects of Nutrients on Algae in Jamaica Bay*

$12,000 02-Nov-2011 to 29-Feb-2012 Woods Hole Oceanographic Institution *Understanding the Distribution, Effects, and Mitigation Strategies for Novel Cochlodinium Polykrikiodes Blooms in Great South Bay, NY, USA*

$13,500 01-Jun-2010 to 18-Jan-2012 State of Maryland Department of Natural Resources *Coastal Bays Brown Tide Assessment Project*

$10,000 01-Jan-2009 to 16-Nov-2011 Cornell Cooperative Extension of Suffolk County *Genetic Diversity of Eelgrass Populations in the Peconic Estuary*

$45,000 01-Jan-2011 to 31-Oct-2011 Cornell Cooperative Extension of Suffolk County *Restoration of Peconic Bay Scallop Populations and Fisheries*

$524,992 15 September 2006 to 31 August 2010 National Science Foundation *Regulation of Dinoflagellate Bloom Dynamics by Vitamins and Micronutrients*

$449,947 28 March 2007 to 27 March 2011 U.S. Environmental Protection Agency *Impacts of Nutrients, Zooplankton and Temperature on Growth and Toxin Production*

Kathryn Kavanaugh

Grants

$25,397 15 April 2008 to 31 December 2010 University of Oslo *The Early Stage of Adaptive Divergence: the Speed of Evolution*

Marat Khairoutdinov

Publications

DeMott, C. A., C. Stan, D. A. Randall, J. L. Kinter III and M. Khairoutdinov. 2011: The Asian monsoon in the super-parameterized CCSM and its relation to tropical wave activity. *Journal of Climate* 24(19): 5134-5156. DOI: 10.1175/2011JCLI4202.1

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DeMott, C. A., D. A. Randall and M. Khairoutdinov. 2010. Implied ocean heat transports in the standard and super-parameterized community atmospheric models. *Journal of Climate* 23: 1908-1928.

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$400,298 01-Jul-2008 to 30-Jun-2012 National Oceanic and Atmospheric Administration *Multiscale Modeling of the Indirect Impact of Atmospheric Aerosols on Climate*

$83,079 15-Sep-2010 to 31-Aug-2012 National Science Foundation *Convective Organization and Climate*

$329,872 15-Jun-2011 to 31-May-2012 National Science Foundation *Simulations of Anthropogenic Climate Change Using a Multi-Scale Modeling Framework*

Daniel Knopf

Publications

Knopf, D.A. and S.M. Forrester. 2011. Freezing of water and aqueous NaCl droplets coated by organic monolayers as a function of surfactant properties and water activity. *Journal of Physical Chemistry A* 115(22): 5579-5591.

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$572,764 12-May-2008 to 30-Jun-2012 National Oceanic and Atmospheric Administration *The Role of the Organic Aerosol Fraction on Ice Nucleation in the Atmosphere*

$380,791 10-Feb-2009 to 31-Mar-2012 National Science Foundation *Chemical Aging of Biomass Burning Aerosol by Heterogeneous and Photosensitized Heterogeneous Reactions with Atmospheric Trace Gases*

$42,147 01-Aug-2010 to 31-Jul-2012 National Science Foundation *A Field Intercomparison of High-Resolution Proton-Transfer-Reaction Time-of-Flight Mass Spectrometers*

$65,500 01-Apr-2011 to 31-Mar-2012 National Science Foundation *A New Technique for Vertical Profiling of Volatile Organic Compounds Within and Above the Convective Boundary Layer*

Cindy Lee

Publications

Pasqual, C., C. Lee, M. Goni, T. Tesi, A. Sanchez-Vidal, A. Calafat, M. Canals and S. Heussner. 2011. Use of organic biomarkers to trace the transport of marine and terrigenous organic matter through the southwestern canyons of the Gulf of Lion. *Marine Chemistry* 126(1-4): 1-12 DOI: 10.1016/j.marchem.2011.03.001

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Grants

$496,689 01-Jul-2009 to 30-Jun-2012 National Science Foundation *Effects of Ocean Acidification on the Formation and Sinking of Particle Aggregates*

$31,026 05-May-2008 to 30-Apr-2012 Virginia Institute of Marine Science *U.S. Eastern Continental Shelf Carbon Cycling (USECoS): Modeling Data Assimilation and Analysis*

$285,864 01 September 2007 to 31 August 2010 National Science Foundation *Resistance of Peptide Degradation Products in Seawater*

Darcy Lonsdale

Publications

Jiang, X., D.J. Lonsdale, and C.J. Gobler. 2011. Rapid gain and loss of evolutionary resistance to the harmful dinoflagellate *Cochlodinium polykrikoides* in the copepod *Acartia tonsa*. *Limnology and Oceanography* 56(3): 947-954.

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$201,118 15 September 2006 to 28 February 2011 National Science Foundation *Do Crustacean Zooplankton Play a Pivotal Role in Structuring Heterotrophic Plankton Communities in the Ross Sea?*

Kamazima Lwiza

Grants

$14,117 01 September 2010 to 31 August 2011 National Science Foundation *Planning Visit to East Africa for Environmental Research on Lake Victoria*

John Mak

Publications

Oikawa, P.Y., B.M. Giebel, L.D.O. Sternberg, L. Li, M.P. Timko, P.K. Swart, D.D. Riemer, J.E. Mak and M.T. Lerdau. 2011. Leaf and root pectin methylesterase activity and (13)C/(12)C stable isotopic ratio measurements of methanol emissions give insight into methanol production in *Lycopersicon esculentum New Phytologist* 191(4): 1031-1040 DOI: 10.1111/j.1469-8137.2011.03770.x

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Grants

$793,328 01-Sep-2007 to 31-Aug-2012 National Science Foundation *Application of the Isotopes of Carbon Monoxide as Tracers of Current OH Trends and Preindustrial CO Chemistry*

$628,337 01-Oct-2011 to 30-Sep-2012 National Science Foundation *The Chemistry and Sources of Carbon Monoxide in Present and Past Atmospheres*

Anne McElroy

Publications

McElroy, A.E., M.G. Barron, N. Beckvar, S.B. Kane Driscoll, J.P. Meador, T.F. Parkerton, T.G. Preuss and J.A. Steevens. 2010. A review of the tissue residue approach for organic and organometallic compounds. *Integrated Environmental Assessment and Management*, 7 (1):50-74. DOI: 10.1002/ieam.132

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Grants

$196,667 01 June 2007 to 31 August 2010 National Fish and Wildlife Foundation *Effects of Endocrine Disrupting Chemicals*

Munch, Stephan

Grants

$449,343 01 April 2007 to 31 March 2011 National Science Foundation *The Balance of Selection on the Growth Trajectory of Fishes*

$168,572 01 April 2007 to 31 March 2011 National Science Foundation *Bayesian Semiparametric Population Dynamics Modeling*

Pales-Espinosa, Emmanuelle

Grants

$278,143 01 September 2007 to 31 August 2010 National Science Foundation *Separating the Grain from the Chaff: A Functional and Comparative Approach to Elucidate Particle Selection Mechanisms in Suspension-feeding Molluscs*

Bradley Peterson

Publications

Tettelbach, S.T., B.J. Peterson, J.M. Carroll, J.R. Europe, R.M. Patricio, J. Chagnon, K. Cahill, J. Clauss, S.W.T. Hughes and C.F. Smith, CF. 2011. Resurgence of bays scallop, *Argopecten irradians*, populations and fisheries after large-scale restoration efforts in eastern Long Island, New York. *Journal of Shellfish Research* 30(2): 557-557.

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Grants

$34,571 22-Jul-2011 to 30-Sep-2012 National Park Service *Monitoring Estuarine Condition at Fire Island National Seashore, Sagamore Hill National Historic Site and Gateway National Recreation Area*

$35,984 22-Jun-2010 to 01-Mar-2012 National Park Service *Monitoring Estuarine Condition at Fire Island National Seahore, Gateway National Recreation Area and Sagamore Hill National Historic Site*

$53,450 01-Mar-2011 to 28-Feb-2012 Hudson River Foundation *Investigating Ecological Restoration: Enhancement of Fisheries Due to the Presence of Oyster Reefs in the Hudson River*

$98,440 21 July 2007 to 01 March 2010 National Park Service *Monitoring Estuarine Conditions at Fire Island National Seashore*

Ellen Pikitch

Publications

Estes, J.A., J. Terborgh, J.S. Brashares, M. E. Power, J. Berger, W.J. Bond, S.R. Carpenter, T. Essington, R.D. Holt, Jeremy B.C. Jackson, R.J. Marquis, L. Oksanen, T. Oksanen, R.T. Paine, E.K. Pikitch, W. J. Ripple, S. Sandin, M. Scheffer, T. Schoener, J.B. Shurin, A.R.E. Sinclair, M.E. Soule, R. Vertanin and D.A. Wardle. 2011. Trophic downgrading of planet Earth. *Science* 333(6040): 301-306.

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Grants

$2,137,500 01-Jul-2008 to 15-Feb-2012 Pew Charitable Trusts *Stony Brook Institute for Ocean Science Research Support*

$750,000 01-Aug-2008 to 31-Dec-2011 Pew Charitable Trusts *Lenfest Forage Fish Task Force*

Mary Scranton

Publications

Monteiro, P.M.S., B. Dewitte, M.I. Scranton, A. Paulmier and A.K. van der Plas. 2011. The role of open ocean boundary forcing on seasonal to decadal-scale variability and long-term change of natural shelf hypoxia . *Environmental Research Letters* 6(2) Article Number: 025002 DOI: 10.1088/1748-9326/6/2/025002

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Grants

$989,845 01-Dec-2008 to 30-Nov-2013 National Science Foundation *The Cariaco Basin Oceanographic Time Series Program*

$8,499 01-Jul-2009 to 31-Aug-2011 Rutgers University *Subcontract to Measure Methane During Cruise of Henry Bigelow in August 2009*

Swanson, Larry

Publications

Tonjes, D. J., C. A. O'Connell, O. Aphale and R. L. Swanson. 2011. Human sanitary wastes and waste treatment in New York City. *In: Environmental History of the Hudson River*. R. E. Henshaw, ed. State University of New York Press. Albany, NY. pp. 219-232.

Swanson, R.L., C. Hall, and K. Kramss. 2011. Suffolk County, NY, a national leader in environmental initiatives. Why? *Long Island History Journal* 22(2): 1-29.

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Grants

$596,902 01 May 2010 to 31 May 2013 New York State Department of State. *Western Bays Water Quality Monitoring System* (w/ J.K. Cochran, H. Bokuniewicz, R.E. Wilson, C. Flagg)

$180,789 30-Oct-2009 to 31-Aug-2011 Battelle Memorial Institute *Nutrient Assessment and Management in Shallow Coastal Embayments in New York and New Jersey*

$142,543 01-Jan-2009 to 31-Mar-2011 University of New Haven *Evaluation of Hypoxia in Smithtown Bay*

$89,000 08 November 2007 to 30 April 2010 Town of Brookhaven *Forge River Synthesis Report*

Gordon Taylor

Publications

Edgcomb, V., W. Orsi, G.T. Taylor, P. Vdacny, C. Taylor, P. Suarez and S Epstein. 2011. In situ access to marine protists from the anoxic Cariaco Basin. *International Society for Microbial Ecology Journal*, doi:10.1038/ismej.2011.10

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Grants

$989,845 01 December 2008 to 30 November 2013 National Sciences Foundation *The Cariaco Basin Oceanographic Time Series Program*

$199,746 01 March 2009 to 31 December 2011 New York Sea Grant *Interaction of Biological and Physical Factors Controlling Bottom Dissolved Oxygen*

Dong-Ping Wang

Publications

Wang, D-P., C.N.Flagg, K. Donohue and H.T. Rossby. 2011. Wavenumber spectrum in the Gulf Stream from shipboard ADCP observations and comparison with altimetry measurements. *Journal of Physical Oceanography* 40(4): 840-844 DOI: 10.1175/2009JPO4330.1

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Warren, Joseph

Publications

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Cox, M.J., J.D. Warren, D.A. Demer, G.R. Cutter and A.S. Brierley. 2010. Three-dimensional observations of Antarctic krill (*Euphausia superba*) swarms using a multi-beam echosounder. *Deep Sea Research II* 57: 508-518.

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$205,191 06-Aug-2010 to 31-Aug-2012 National Science Foundation *Acoustic Assessment of Southern Ocean Salps and their Ecosystem Impact*

$220,985 01-Feb-2009 to 31-Aug-2011 US Navy Office of Naval Research *Fine-scale Survey of Right and Humpback Whale Prey Abundance and Distribution*

$85,099 20 May 2008 to 31 January 2010 National Oceanic and Atmospheric Administration *Modeling the Target Strength of Bering Sea Euphausiids*

$83,472 01 January 2011 to 31 December 2011 Oregon State University *Acoustical Scattering, Propagation and Attenuation Caused by Two Abundant Pacific Schooling Species: Humboldt Squid and Hake*

Zhang, Minghua

Publications

Gent, P.R., G. Danabasoglu, L.I. Donner, M.M. Holland, E.C. Hunke, S.R. Jayne, D.M. Lawrence, R.B. Neale, P.J. Rasch, M. Vertenstein, P.H. Worley, Z.L. Yang and M. Zhang. 2011. The Community Climate Model System Versin 4. *Journal of Climate* 24(19): 4973-4991 DOI: 10.1175/2011JCLI4083.1

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$498,578 01-Jan-2009 to 31-Dec-2012 National Science Foundation *Interfacing Major Field Experiments with Physical Parameterizations in Atmospheric General Circulation Models*

$543,900 15-Sep-2009 to 14-Sep-2012 US Department of Energy *Continuous Evaluation of Fast Processes in Climate Models Using Arm Measurements*

$358,550 15-Sep-2011 to 14-Sep-2012 US Department of Energy *Development of Integrated ASR Model Forcing Data and Their Applications to Improve CAM*

$716,296 01-Aug-2007 to 31-Jul-2012 US Department of Energy *Improved Atmosphere-Ocean Coupled Modeling in the Tropics for Climate Prediction*

$570,500 05-May-2009 to 04-May-2012 NASA Goddard Space Flight Center *Using Satellite Measurements to Improve Modeling of Low Clouds and Their Climate Feedbacks in General Circulation Models (GCMS)*

$1,745,291 01-Mar-1998 to 29-Feb-2012 US Department of Energy *Development of Accurate Forcing Data in Support of Single-column Modeling in ARM*

$157,871 01 Jan 2010 to 01 Dec 2012 National Center for Atmospheric Research *Regional Projections of Climate at Decadal Time Scales: High Resolution Global Predictions and Regionally Resolved Source-Response Studies*

$887,948 15 December 2005 to 14 December 2010 NASA Goddard Space Flight Center *Using Satellite Measurements to Improve the Modelling of Low and Middle Clouds and Their Climate Feedbacks*

Qingzhi Zhu

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Fan, Y., Q. Zhu, R. C. Aller and D.C. Rhoads. 2011. An in situ multispectral imaging system for planar optodes in sediments: example high resolution seasonal patterns of pH. *Aquatic Geochemistry* 17(4-5): 457-471.

Cao, Z.R., Q.Z. Zhu, R.C. Aller and J.Y. Aller. 2011. A fluorosensor for two-dimensional measurements of extracellular enzyme activity in marine sediments. *Marine Chemistry* 123(1-4): 23-31.

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Soto-Neira, Q. Zhu and R.C. Aller. 2011. A new spectrophotometric method to quantify dissolved manganese in marine pore waters. *Marine Chemistry* 127 (1-4): 56-63.

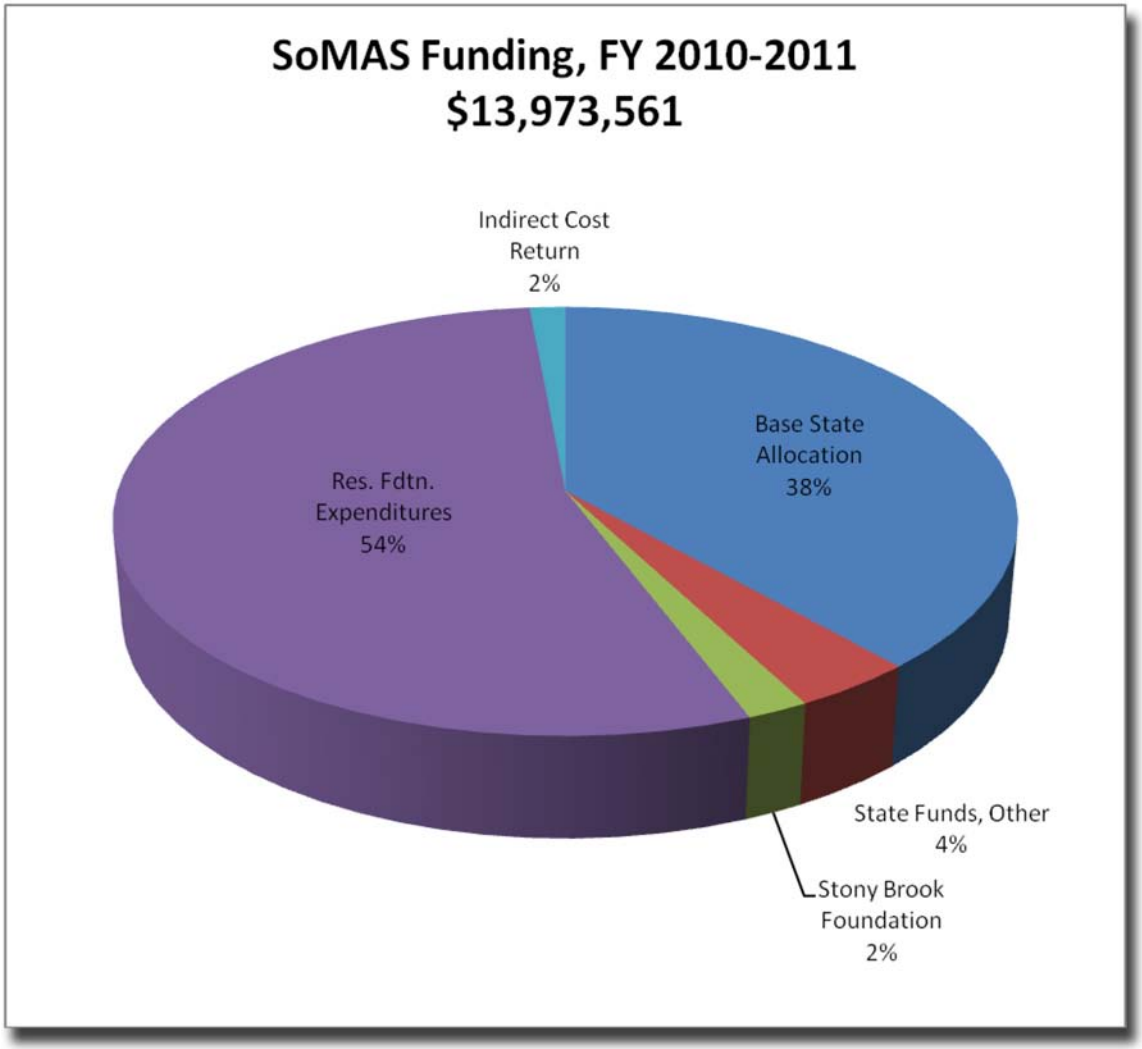
Zhu, Q. and R. Aller. 2010. A rapid response planar fluorosensor for 2-dimensional pCO_2 distributions and dynamics in marine sediments. *Limnology and Oceanography: Methods* 8: 326-336.

Grants

$672,183 01-Sep-2008 to 31-Aug-2012 National Science Foundation *Immunosensors for Water Column and 2-D Sediment Distributions of Vitamin B-12 and Target Organic Solutes*

Financials

Aggregate funding for SoMAS in FY 2010-2011 amounted to $13,973,561. This figure is comprised of several different funding sources, each with its own specific purposes, procedures and constraints. A brief description of these funding sources is presented below. Financing the broad range of SoMAS activities every year requires a strategic expenditure approach that takes maximum advantage of the diversity of funds available to the School.



Base State Allocation

Each year, the New York State Legislature appropriates monies to State University of New York to support the operation of SUNY's many campuses. A portion of these funds flows to Stony Brook University and the University makes an allotment to the School of Marine and Atmospheric Sciences. The SoMAS Base State Allocation is used almost exclusively to fund the salaries of state-supported faculty and staff at the School. A small amount is budgeted for operating supplies and expenses.

State Funds, Other

Not all the research activities conducted by SoMAS each year are funded through the Research Foundation. Over the past decade, a large body of activity developed in the form of specific research and monitoring projects funded at SoMAS by other executive agencies of the State of New York State. Formally-executed Memoranda of Understanding and Interagency Fund Transfers are the common vehicles by which these funds are made available to the School.

Research Foundation Expenditures

The unique requirements of modern research often do not fit well with State expenditure policies and procedures. The Research Foundation of SUNY is a private corporation that provides flexibility in the financial management of sponsored programs and research conducted at SUNY. When an external sponsor provides monies to SUNY to support a research or training activity, those funds are almost always administered through the Research Foundation. Annual Research Foundation expenditures are the conventional measure used to describe the volume of research conducted at a unit of the University.

Stony Brook Foundation

The Stony Brook Foundation is a privately-governed, non-profit corporation created to receive and administer financial gifts to the University, whether undifferentiated or targeted at a specific purpose. SoMAS's various Stony Brook Foundation accounts support student scholarships, outreach activities such as the annual Bay Scallop Bowl, and the general development needs of the School. These accounts bear interest. However, the income reported in the figure is just of new gifts to the School and does not include interest income.

Indirect Cost Returns

The Research Foundation charges an administrative fee on externally-sponsored activities conducted by the University. This fee reimburses the University, in part, for its provision of certain basic costs associated with these activities that are not readily assigned to a specific research or training project; e.g., heat, electric and other utilities provided to a modern research laboratory. The rates and formulae by which these indirect costs are calculated are periodically negotiated between SUNY and the federal government. From this levy, an annual Indirect Cost Return is provided by the Research Foundation to SoMAS as a fraction of the total direct costs of Foundation-funded research conducted at the school in the prior year.