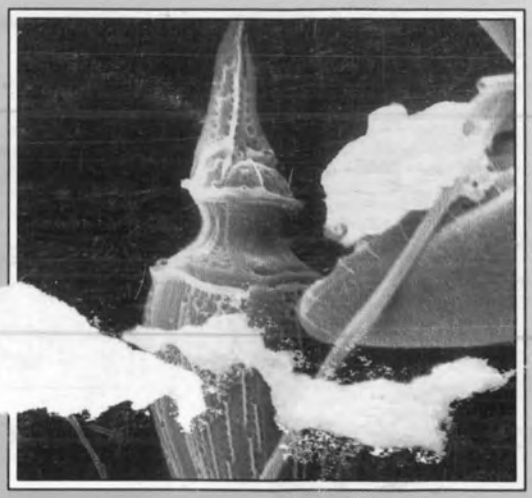
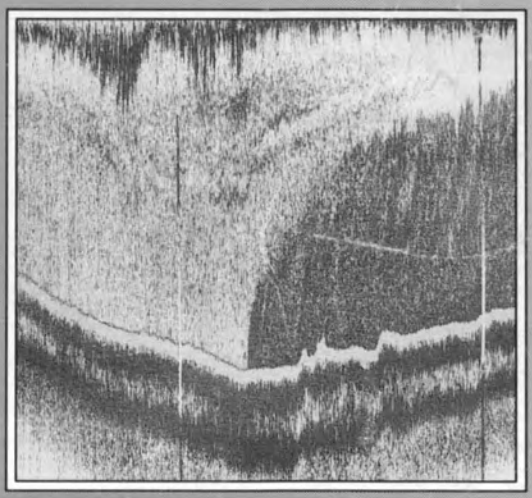
GRADUATE STUDY





The University at Stony Brook

Marine Sciences Research Center

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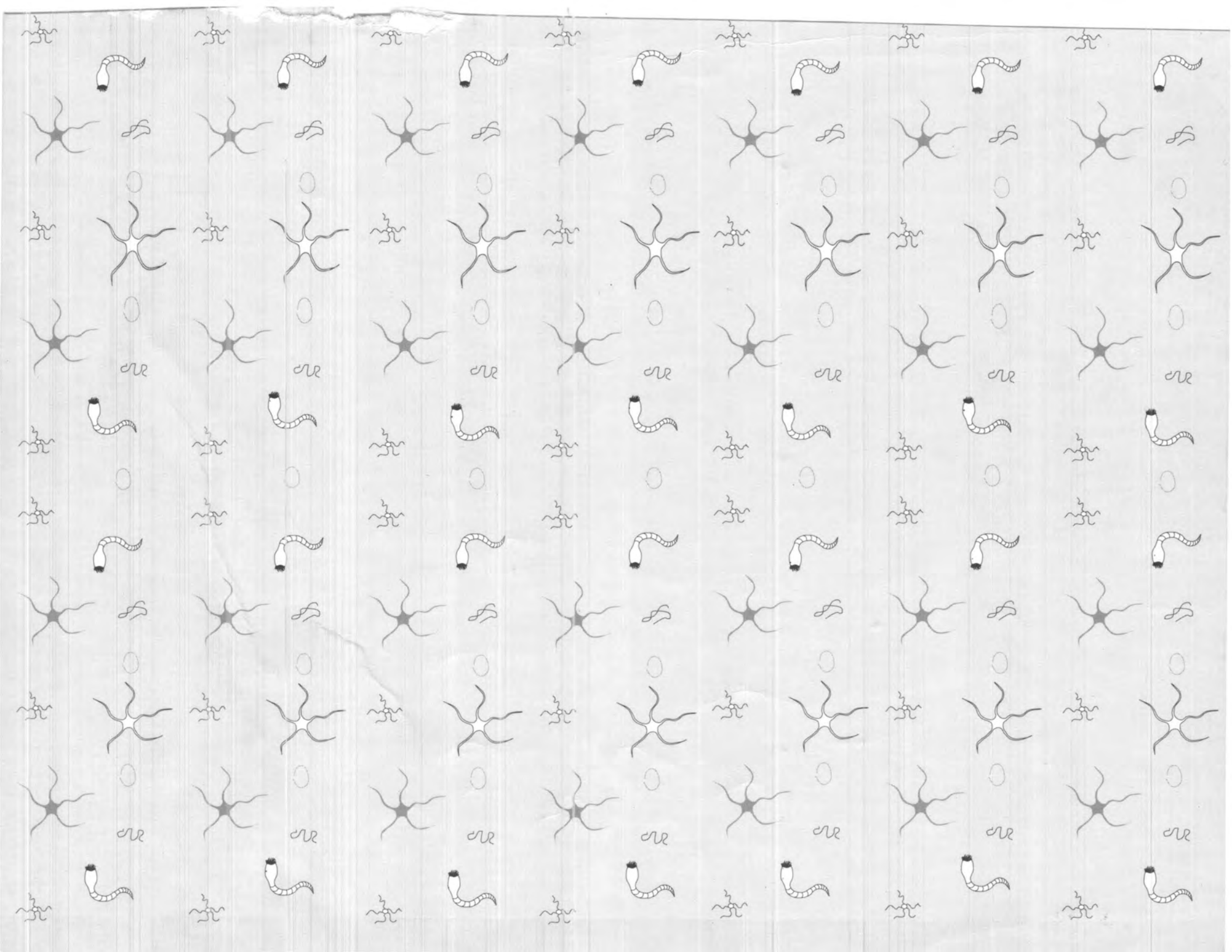


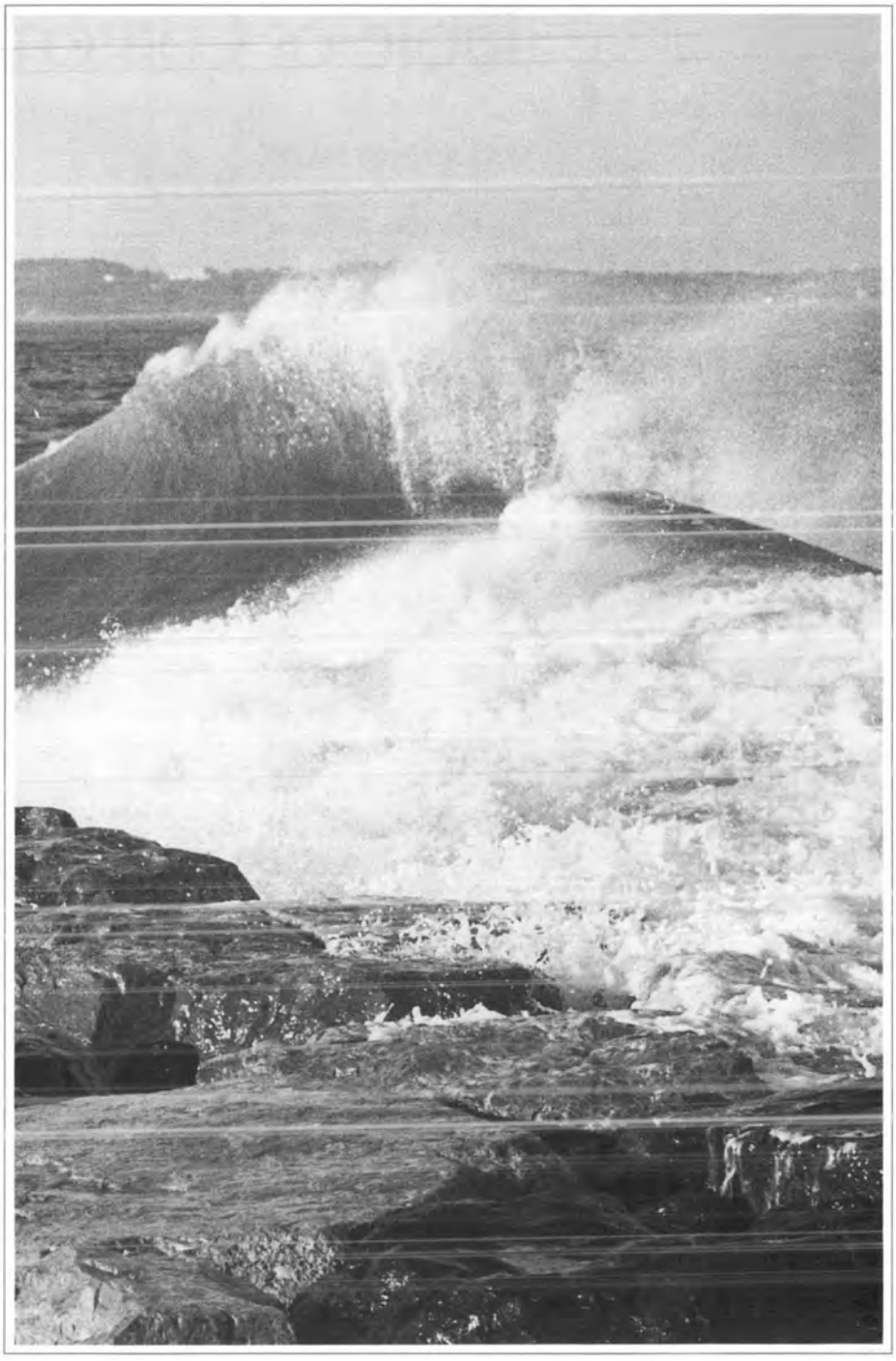
Graduate Study 93/94

MARINE SCIENCES RESEARCH CENTER

The University at Stony Brook

The diversity of coastal environments within an hour's drive of the Center is greater than any comparable region in the world.

MSRC



The choice for graduate studies

The Marine Sciences Research Center (MSRC) is the center for marine research, graduate education, and public service for the entire State University of New York system. The MSRC is also the center for atmospheric sciences research and education at Stony Brook.

The MSRC faculty, who are internationally known for their leadership in research, have been awarded research grants totalling $6.4 million over the past year. This includes more than $1.7 million from the National Science Foundation alone and places MSRC as the eighth largest recipient of NSF ocean science awards in the nation, and first among all coastal institutions.

MSRC is situated on the north shore of Long Island, five miles from Long Island Sound and nearly 50 miles from New York City, in one of the world's greatest natural coastal laboratories. The diversity of coastal environments within an hour's drive of the Center is greater than any comparable region in the world:

- Long Island Sound, a deep estuary modified by glacial processes
- Great South Bay, a bar-built estuary
- Hudson River Estuary, a drowned river valley estuary
- Peconics-Flanders Bay estuary system
- Fire Island, a barrier island with a national seashore
- New York-New Jersey Harbor
- Fresh and saltwater tidal wetlands
- Open continental shelf waters.

The Long Island region now has three of the nation's 21 estuaries designated as nationally significant and included in the U.S. Environmental Protection Agency's National Estuary Program; these are Long Island Sound, Peconics-Flanders Bay estuary system, and the New York-New Jersey harbor estuary.

Nearly 10% of the entire population of the United States lives within 100 miles of MSRC. This large population, unmatched in any other area of comparable size, makes varied, intensive, and competitive demands on the marine environment and the atmosphere.

Regional environmental stresses are characterized by a sharp west to east gradient. Coastal waters of New York Harbor and western Long Island Sound are seriously degraded, yet farther to the east, the waters of the central and eastern Sound and the Peconic Bay system are among the most pristine coastal environments in the United States.

The combination of diversity of environments, their importance to society, and the stresses caused by society make Long Island a natural laboratory for students wishing to pursue careers emphasizing fundamental research on coastal processes or the applications of research to improve environmental management. But even though there is no shortage of local and regional coastal marine problems to study, our students also work on problems in environments as far away as South America, Asia, the Antarctic, the Caribbean, the Mediterranean, and Scandinavia.

MSRC is one of the few comprehensive coastal oceanographic institutions in the world. We combine studies of the coastal seas with global studies of the world ocean and the Earth's atmosphere. Students specializing in atmospheric sciences have the opportunity to participate in research on atmospheric chemistry, climate change, radiation transfer, planetary atmospheres, and spectroscopy of radiatively active molecules.

Whether studying the coastal sea, the deep oceans, or the atmosphere, the MSRC graduate student is given an education across the disciplines that will enable him or her to work effectively on complex research problems. We at MSRC invite you to visit us to personally discover the excitement and challenge of our Center, our university, and our diversity of marine environments.

MSRC offers a rare opportunity to interact with students and faculty from all over the world, in many disciplines, and of all ages. This diversity is a form of learning experience that no oceanogaphy textbook can ever give.

—Shino Tanikawa Ogleby
M.S. Student

have a Master's degree, but exceptional scholars in the Marine Environmental Science Program can have the requirement of a Master's degree waived. A doctoral dissertation is required of all candidates.

Coastal Marine Management and Policy Option

Graduate students who wish to pursue careers in management and policy can now enroll in a rich array of management courses offered by MSRC and the University's Center for Regional Policy Studies and Harriman School of Management and Policy. Students in this option take the four, one-semester core courses in biological, chemical, geological, and physical oceanography. Beyond these courses, graduate students are free to choose from marine-related management courses, such as Environment and Public Health, Fisheries Management, and Regional Planning applied to Marine Sciences. Students pursuing the Management and Policy Option have a wide range of opportunities to conduct their M.S. or Ph.D. research on management and policy problems and issues of local, state, regional, national, and international importance.

Admission to the Programs

Admission to MSRC's graduate programs is highly competitive. Minimum entrance requirements normally include a B.A. or B.S. degree; mathematics coursework through calculus; physics; and introductory courses in at least two of the following areas: chemistry, biology and earth sciences, with advanced work in at least one of these ar- eas.

An overall B (3.0) average is required with significantly better performance in the students major field. Students must have taken the GREs, and foreign students must take the TOEFL exam to complete admission requirements.

Because the program is both interdisciplinary and innovative, applicants who are exceptionally well qualified by experience or training, but lack certain undergraduate preparation, may be admitted on the condition that they complete some preliminary courses after admission.

Special Programs

Five-Year BS/MS Program

ESS and MSRC:

MSRC and Stony Brook's Depart ment of Earth and Space Sciences (ESS) offer a cooperative undergraduate/graduate course of study in Geological Oceanography leading to the B.S. and M.S. degrees. Students enter the Geological Oceanography track in the ESS department to obtain the B.S. degree.

In their senior year, students may, with approval, begin to take graduate courses offered by MSRC. Students doing well in the undergraduate program may be considered for admittance to an accelerated Master's program offered by MSRC. Most students in this program obtain their B.S. and M.S. degrees in five years.

Five-Year BE/MS Program

CEAS and MSRC:

A joint program with the College of Engineering and Applied Sciences (CEAS) and MSRC enables a student majoring in Engineering Science to specialize in Marine Environmental Science and to obtain both an undergraduate engineering B.E. degree and a Master's degree in an additional 14 months. The student must include in their curriculum several of the MSRC core courses.

Dillard University Articulation Agreement

MSRC is committed to increasing the number of African-Americans and other groups underrepresented in the environmental field and, particularly, in the marine and atmospheric sciences. MSRC has created a cooperative agreement with Dillard University, a historically African-American institution in New Orleans.

The agreement enables Dillard undergraduates to spend the spring semester of their junior year and the fall semester of their senior year at the University at Stony Brook. Following the completion of their fall semester at Stony Brook, they return to Dillard to graduate.

The following summer, they return to enter the graduate program at MSRC. By spending a year at Stony Brook as an undergraduate, Dillard students have a head start in the graduate program, making the transition from undergraduate to graduate study easier. All students in the Dillard Program are provided financial support both as undergraduates and as graduate students.

Financial Assistance

MSRC provides more than 95% of our students with complete funding through university graduate and teaching assistantships (GA/TA) and research project assistantships (RPA). The minimum amount of these assistantships for the 1993-94 nine-month academic year is $8,850. Most students are supported through sponsored research projects over the summer at a rate of up to $3,885. Full tuition scholarships can accompany the award of a fellowship, a full GA/TA, or a full RPA.

Special Awards

MSRC has a variety of special awards available to graduate students. Increased stipends are available to the most outstanding students in recognition of their excellence. Special awards are available to assist students in completing their research and for travel to national and international meetings to present the results of their research.

MSRC is at the vanguard of a new public awarness of the importance and fragility of the coastal zone. I cannot imagine a more exciting opportunity for prospective students seeking to make a meaningful contribution to important issues, while at the same time receiving a high quality education.

— Mead Allison
Ph.D. Student

The environment at MSRC is like a large family—everyone is in close contact with one another. I feel very comfortable discussing my research and problems with other students and faculty members.

— Jungin Wertz
M.S. Student

Minorities Research Awards for Stony Brook Students

The Minorities in Oceanography Program provides limited funds to offer promising minority undergraduate students, who are matriculated at Stony Brook, an opportunity to actively participate in oceanographic or atmospheric research with an MSRC faculty member. The goal of these awards is to increase the student's awareness of marine and atmospheric sciences and to induce them to pursue graduate education at MSRC.

Alumni Award

The MSRC Alumni Association annually provides a financial award for the best Master's degree student thesis project.

Special Fellowships

The M.P. OBrien Fellowship Program

This fellowship program acknowledges the manifold contributions of Professor OBrien and is intended to stimulate interest in graduate studies at MSRC in beach and nearshore processes and coastal engineering. Fellowships are awarded for two years and may be renewed. Each fellowship carries a stipend of $10,000 for the nine-month academic year and a full tuition scholarship. The stipend may be supplemented by up to $3,500 for the summer.

J. L. McHugh Fellowship

This fellowship is awarded each year to an outstanding first-year student interested in fisheries or fisheries management.

Donald W. Pritchard Fellowship

This fellowship is awarded each year to an outstanding first year physical oceanography student interested in the physics of estuaries and nearshore waters.

Life at MSRC

Student-Faculty Interactions

MSRC's faculty members have traditionally established personal, supportive relationships with the students. The breadth of expertise represented by our faculty allows students a great amount of flexibility in choosing a graduate advisor and also provides a large pool of resources for solving multidisciplinary research problems.

MSRC's graduate students are considered colleagues — as professionals who participate fully in the intellectual life of the Center. Graduate students serve on almost every committee, having a voice in such activities as hiring of new faculty members and decisions about the graduate programs.

Sponsored Activities

Many activities exist to keep the graduate student active on south campus, where the Center is located, and an additional wealth of sponsored activities exists on main campus within each science department. MSRC sponsors several programs that bring visiting scholars to the Center for either one day to give a seminar, or for extended stays. These longer visits

The MSRC provides excellent opportunites to explore the means by which hard science can be incorporated into government management decisions. Upon graduation, I found myself equally qualifed to pursue a career as a researcher or a career in environmental policy.

— Cynthia Decker
Ph.D. 1992
Sea Grant Fellow
Environmental Quality Liaison, Office of Naval Research
Washington, D.C.

give students ample opportunity to question, exchange ideas, and get to know outstanding scientists from institutions around the world, who offer different perspectives.

Coastal Marine Scholar Program

This program brings an outstanding recent Ph.D. scholar to the Center each year. These scholars, who spend two years at the Center, are sought through an international search and have backgrounds in oceanography, atmospheric sciences, engineering, or mathematics. Coastal Marine Scholars play an important role in fostering interactions and collaborations with MSRC faculty and students on problems of common interest.

Lawrence Distinguished Visiting Scholar Program

Each year a committee of faculty members, staff, and students select four to six of the world's most outstanding scientists, to spend a week at MSRC. During their week's stay, these scholars, who are world leaders in their own fields, present seminars and one public lecture, and interact extensively with the graduate students, discussing problems of common interest.

Graduate Seminar Program

This program brings more than a dozen of the most renowned marine and atmospheric scientists from all over the world each year to the Center to speak about their exciting research and latest discoveries at a

weekly seminar. These seminars attract faculty, students, and staff to interact with outside researchers. Speakers include researchers from around the world discussing topics ranging from sediment discharge by rivers of the world to ozone depletion in the Antarctic.

Friday Discussion Group

A more casual forum to exchange ideas and information is the Friday Discussion Group, a weekly ritual that brings faculty and students together over coffee, tea, and cookies. Speakers are usually drawn from the MSRC community, and presentations include work-in-progress, reports of meetings, practice talks for students and slide shows of exotic field work.

Extracurricular Activities

Besides the more academic activities, a number of events draw MSRC students, faculty and staff together socially. Several events have become a tradition at MSRC. One is the annual international dinner, when faculty, students, and staff prepare and share dishes from all nations. Another is the annual Flax to Vax race, when students compete with the faculty in a five-mile run from Flax Pond to the Center. Everyone wins at the pot-luck festivities that follow.

Every fall, the Graduate Programs Office sponsors a welcoming picnic for new students. Other events are more impromptu, such as softball games and volleyball at the sand court by Discovery Hall.

Resources and Facilities

MSRC is housed in four one- story buildings one-half mile from Stony Brook's main campus, at the south campus. Ample, well- equipped laboratories form the central core of each building, with offices and dry laboratories along the perimeter.

Flax Pond Marine Environmental Laboratory

Located approximately five miles from the Center on a tidal salt marsh preserve flushed by Long Island Sound, is the Flax Pond Marine Laboratory. This 8,000-square-foot research facility is equipped with running seawater circulating through more than 20 sea tables and aquaria and an 800-square-foot greenhouse.

Equipment and Instrumentation

MSRC has a major commitment in staff, equipment, and instrumentation to provide researchers with the most recent technology to conduct experiments both in the lab and at sea. Equipment is often specially designed and pre-cruise tested for individual needs. Equipment and instruments maintained by individual faculty through research grants are also state-of-the art and include some of the most sophisticated instrumentation used in the marine sciences today.

With a subject as vast as contemporary marine sciences, each discovery generates as many questions as answers. Yet, for those prepared to rise to the challenge, MSRC is a unique place to work at the boundaries between disciplines, where discovery and identification of trends are most likely. My marine remote sensing research progress, starting at MSRC, attests to our ability to meet the challenges of marine science's new frontier and to MSRC's commitment to educating a new generation of marine scientists.

— Xiao-Hai Yan
Ph.D. 1989
Assistant Professor,
Associate Director,
The Center for
Remote Sensing
University of Delaware

Research Vessels

At the head of our fleet of research vessels is the 60-foot steel-hulled *ONRUST* (Dutch for restless), built specifically for MSRC. The R/V *ONRUST* is completely equipped for coastal oceanographic research with 168 square feet of wet laboratory, 21 linear feet of bench and sink space, a hydraulic gantry and 1 ton cargo boom on the 340-square-foot aft work deck. A recent addition to our fleet is the 48-foot trawler yacht, the R/V *Lord Jim*, used as a floating classroom and meeting room. The Center also maintains several small boats and support vehicles for field research in sheltered waters around Long Island, including the R/V *Siome*, a 23-foot shallow draft cabin cruiser; two 17-foot Boston Whalers; and a 24-foot open workboat.

Computer Facilities

The Center maintains two microcomputing laboratories with IBM PCs and Apple Macintoshes for student use, a remote sensing laboratory with a VAXstation II/GPX, and a graphic lab with a Calcomp 910/563 and Calcomp 907/1051. There is also a terminal lab with four VT100 CRT terminals and two LA120 hardcopy terminals; a workstation lab with six VAXstation 2000s, VAX 8530, VAX 6310, and VAX 6510; and VAX 11/730 minicomputers.

Information Center (MASIC)

The Marine and Atmospheric Sciences Information Center is making the transition from a local reference room to a modern, technologically advanced prototype of the knowledge center of the future. The holdings include important marine and atmospheric science core journals, beginning and advanced monographs and texts, key reprints, MSRC Master's theses and doctoral dissertations, MSRC special reports, nautical charts and maps, and a general science reference collection.

Current computer capabilities include access to STARS (the on-line NOTIS catalog for all campus libraries); the Aquatic Sciences and Fisheries Abstract database and the Regional Serials database (LLRC) on CD-ROM; and access to over 400 international databases through Dialog Information Services.

Planned expansion of these facilities includes obtaining required journal articles via high-speed facsimile equipment from campus branch libraries and other research facilities; access to other indexing services and SUNY campus library collections (via the Main Library); the expansion of CD-ROM databases online, and access to other collections via Internet.

MSRC is of optimal size and dynamics to provide a unique graduate school experience. It is large enough to accommodate students and faculty from many parts of the world with research interests in different disciplines in many parts of the world. Yet, it is small enough that everybody interacts with one another. It is this "climate" that allowed me to enter into a different field—biological oceanography via remote sensing—while having a physics background.

– Ajit Subramaniam
Ph.D. Student

I've had an opportunity here at MSRC to develop a completely new approach to shoreline modeling. I've been allowed freedom and have been encouraged to try something different.

– Matthew Morgan
M.S. Student

The State University of New York at Stony Brook

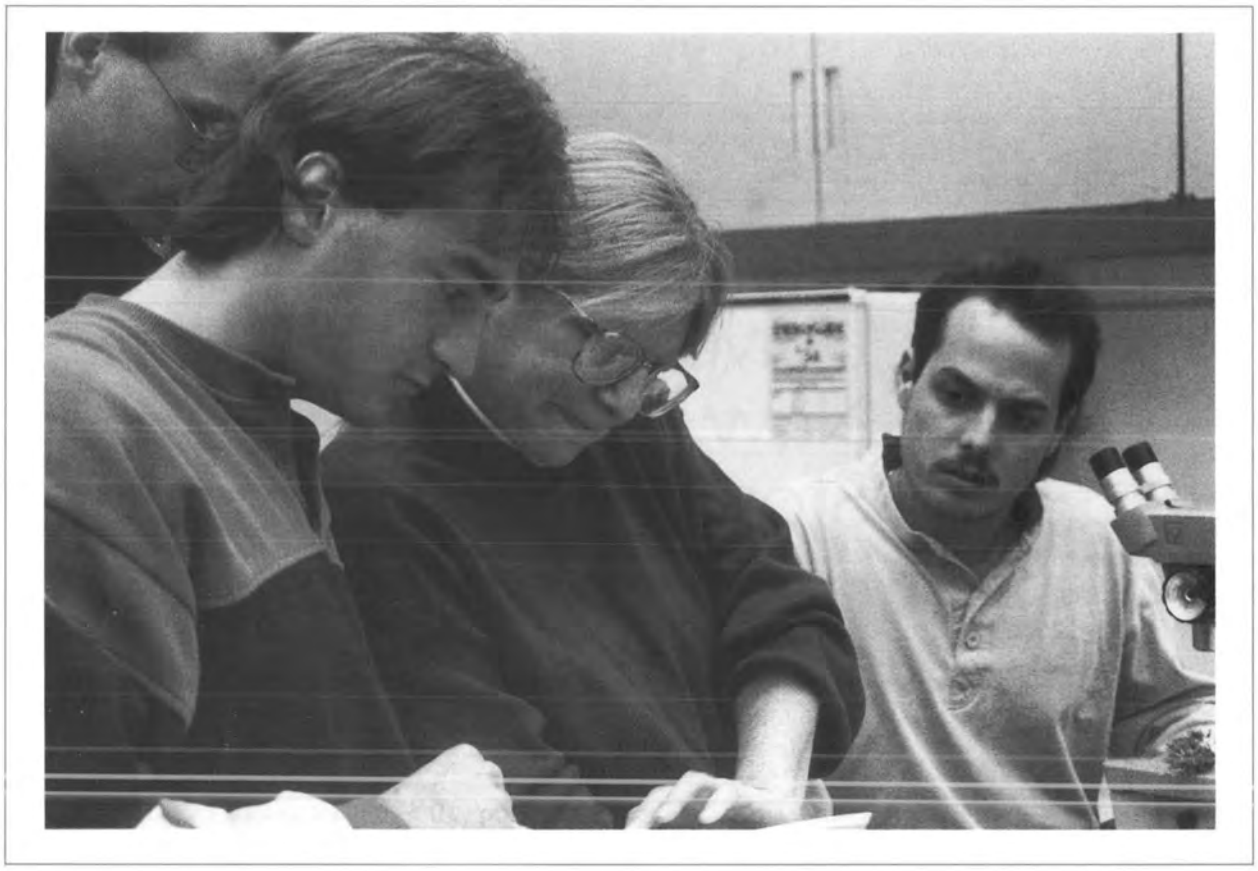
MSRC is a part of the University at Stony Brook, which has been designated by the Carnegie Foundation as a Type I Research Institution, a ranking based on academic excellence and research funding awards, among other criteria. Since its establishment in 1957, Stony Brook has grown to occupy 103 buildings on an 1,100-acre campus set amid fields, orchards, woods and a 26-acre nature preserve. Stony Brook's faculty have grown from 175 to 1,500 and the student body from 1,000 to 17,000, 6,000 of whom are graduate students.

One of the University's 103 buildings, the Staller Center for the Arts, is a modern concert hall-art gallery-office building that hosts national and international performances and exhibits. The campus recently added a new field house for larger sports matches and performances, with arena seating of 4,100 and a five-lane indoor track.

Research at Stony Brook pervades all disciplines, attesting to the diversity and vitality of its faculty. The annual research budget at Stony Brook currently exceeds $70 million. Stony Brook now ranks among the top 25 institutions receiving funding from the National Science Foundation. Graduate departments exist in all disciplines, with most of our science departments ranked among the nation's top 30 and several ranked among the top 20.

The presence on our campus of the many other fine departments, research institutes and centers, graduate school of business, college of engineering, and tertiary care facility hospital-health sciences center complex offers the MSRC graduate student a wealth of additional resources for research, education, and personal opportunities to augment and expand their marine sciences experience.

The Faculty at MSRC



Josephine Y. Aller

Associate Research Professor
Ph.D., 1975
University of Southern California

The activities of bottom-dwelling organisms modify the physical and chemical properties of sediments very near the sediment-water interface and thereby influence a variety of ecological processes. My research interests concern (1) the importance of macrofauna and meiofauna on microbial metabolism and the decomposition of organic matter in marine sediments and (2) the impact of physical disturbance on the structure and functioning of benthic communities in marine environments.

One of the areas of current research in my laboratory involves the study of the structure and dynamics (recruitment, growth, survival, and activities) of the benthic community on one of the most physically active continental shelf environments in the world—the Amazon. This research is part of a multidisciplinary project to understand the impact of seasonal variability in the discharge conditions of the Amazon River on shelf processes. We are interested in elucidating the major physical, chemical, and biological factors controlling diagenetic and benthic community patterns and evaluating the importance of biological activities to sedimentary and geochemical processes on the shelf.

Other active research areas include (1) the examination of spatial and seasonal variability in biomass and abundance of bottom infauna in relation to oxygen demand and nutrient fluxes from the sediments in Long Island Sound; (2) an investigation into the impact of chronic low oxygen on survival, growth, metabolic rate, and reworking activities of benthic infauna; (3) a study of the bottom dwelling fauna in a deep-sea habitat, which is periodically disturbed by strong near-bottom currents; and (4) understanding the role of meiofauna in influencing nutrient exchange near the sediment-water interface.

Green, M.A.; Aller, R.C.; Aller J.Y. Carbonate dissolution and temporal abundances of foraminifera in Long Island Sound sediments. Limnology and Oceanography 38(2) 331-345; 1993.

Aller. R.C.; Aller J.Y. Meiofauna and solute transport in marine muds. Limnology and Oceanography 37(5)1018-1033; 1992.

Green, M.A.; Aller, R.C.; Aller, J.Y. Experimental evaluation of the influences of biogenic reworking on carbonate preservation. Marine Geology; 107:175-181; 1992.

Kristensen, E.; Aller, R.C.; Aller, J.Y. Oxic and anoxic decomposition of tubes from the burrowing sea anemone *Ceriantheopsis americanus:* implications for bulk sediment carbon and nitrogen balance. Journal of Marine Research; 49:1-28; 1991.

Aller, J.Y. Quantifying sediment disturbance by bottom currents and its effect on benthic communities in a deep-sea western boundary zone. Deep-Sea Research; 36(6):901-934; 1989.

Aller, J.Y.; Aller, R.C. General characteristics of benthic faunas on the Amazon inner continental shelf with comparison to the shelf off the Changjiang River, East China Sea. Continental Shelf Research; 6:291-310; 1986.

Robert C. Aller

Professor
Ph.D., 1977
Yale University

I am interested in diagenetic reactions involving the decomposition of organic matter and dissolution, mobilization, and reprecipitation of metals sensitive to oxidation-reduction reactions. These reactions are most intense and rapid in the upper meter, and especially in the upper 10 centimeters, of marine sediment. It is in this upper zone where most benthic organisms live and interact with sediments and where exchange of material between sediment and overlying water is largely determined. Knowledge of diagenetic processes occurring in this zone is, therefore, essential for understanding the chemistry of sediments and of water overlying the sediment, certain ecological interactions and adaptations of marine organisms, and long-term recording of historical information in marine deposits such as fossil preservation.

My students and I are currently studying selected aspects of sediment diagenesis and exchange rates of dissolved material across the sediment-water interface in a variety of coastal and deep-sea marine areas, including Long Island Sound, Florida Bay, the Amazon shelf, and Panama Basin. Our research places particular emphasis on the way macrobenthic organisms influence these processes and how to quantitatively model them. Large scale diagenetic patterns related to sedimentary facies are also emphasized. We have several collaborative projects with other MSRC faculty, including Josephine Aller, J. Kirk Cochran, Cindy Lee, Chuck Nittrouer and James Mackin. Several of our research projects are listed here:

1) Interstitial water and sediment chemistry near the sediment-water interface, where Fe, Mn, Al, F, chloropigments and products of SO_4 reduction are of special interest.
2) Rates and kinetics of authigenic mineral dissolution-precipitation reactions (e.g., $CaCO_3$) near the sediment-water interface. Rates are obtained by diagenetic modeling as well as by direct laboratory measurements.
3) Animal-sediment interactions, particularly biogeochemical, of macrobenthos living in soft-bottom regions of the sea floor.
4) Studies of diffusion coefficients in fine-grained sediments.
5) Effects of macrobenthic organisms on microbial metabolic activity and on the rate and distribution of biogenic and abiogenic reactions in the bioturbated zone of sediments.
6) The distribution of natural radionuclides of the U-Th series, particularly U-238, U-234, Th-234, and Pb-210 in bioturbated near-shore and deep-sea marine sediments.

Rude, P.D.; Aller, R.C. Fluorine mobility during early diagenesis of carbonate sediment: an indicator of mineral transformations. Geochimica et Cosmochimica Acta 55:2491-2509; 1991.

Aller, R.C., Bioturbation and manganese cycling in hemipelagic sediments. Phil. Trans. R. Soc. London; A; 331:51-68; 1990.

Aller, R.C.; Mackin, J.E. Open-incubation, diffusion methods for measuring solute reaction rates in sediments. Journal of Marine Research 47:411-440; 1989.

Aller, R.C. Benthic fauna and biogeochemical processes in marine sediments. In: Blackburn, T.H., Sorenson, J., eds. Nitrogen cycling in coastal marine environments; New York: John Wiley and Sons; pp. 301-338; 1988.

Aller, R.C.; Rude, P.D. Complete oxidation of solid phase sulfides by manganese and bacteria in anoxic marine sediments. Geochimica et Cosmochimica Acta 52:751-765; 1988.

Edward Beltrami

Professor
Department of Applied Mathematics
Joint with MSRC
Ph.D., 1962
Adelphi University

My career has spanned a number of research areas, from theoretical work in operator theory and mathematical programming to more applications-oriented research in network optimization, stochastic processes, and differential equations. Much of this work has been in connection with models of urban and public sector operations and, most recently, with dynamical models in biomathematics, especially marine ecosystems. I have been a consultant to several planning agencies and municipal governments on problems ranging from refuse collection to coastal zone management.

My previous work has included the use of simple and transparent mathematical models to assess the impact of abatement schemes on coastal pollutions from runoff and wastewater disposal, and to estimate the susceptibility of coastal waters, such as those about Long Island and the Adriatic, to eutrophication. This work included the link to land use activities, and the design of an optimal configuration of treatment facilities.

Concurrent with this is my interest in the dynamics of harmful algal blooms in coastal waters, using mathematical models to determine the threshold levels of effluent that trigger and sustain these explosive growths of cells which have serious health and economic consequences. The models are also used to predict the temporal and spatial distribution of bloom episodes.

Ascioti, F.; Beltrami, E.; Carroll, O.; Wirick, C. Is there chaos in plankton dynamics? Journal of Plankton Research (in press).

Beltrami, E.; Cosper, E.M. Modeling the temporal dynamics of unusual blooms. In: Smayda, T., ed. Fifth Conference on Toxic Phytoplankton Blooms; Amsterdam: Elsevier Press; 731-735; 1993.

Vieira, M.; Cosper, E.M.; Beltrami, E. The role of environmental changes in unusual coastal plankton blooms; ICES Conference Proceedings 195: 223-231; 1992.

Beltrami, E. Mathematical Models in the Social and Behavioral Sciences; Boston: Jones and Bartlett; 1992.

Beltrami, E. Beltrami's operator and the tail of the cat. In: Coen, S., ed. Geometry and Complex Variables; M. Dekker; pp. 11-17; 1991.

Tsiotras, G.; Badr, H.; Beltrami, E. Blocking probabilities for a class of two-station tandem queueing models. IIE Transactions; pp. 331-345; 1991.

Beltrami, E. A mathematical model of the 'brown tide.' Estuaries 12: 13-17; 1989.

Beltrami, E. Brown tide dynamics as a catastrophe model. In: Cosper, E.M. Carpenter, E.; Bricelj, V. M., eds. Novel phytoplankton blooms: causes and impacts of recurrent brown tides and other unusual blooms. Coastal and Estuarine Studies, Vol. 35. Berlin: Springer-Verlag; pp. 307-315; 1989.

Beltrami , E. Mathematics for Dynamic Modeling. Boston: Academic Press; 277 pp.; 1989.

Henry Bokuniewicz

Professor
Ph.D., 1976
Yale University

My research is concerned primarily with the behavior of coastal sedimentary systems and especially the fate of fine-grained sediment particles. My students and I are doing field work to study the transportation of fine-grained sediments in rivers and estuaries, shore changes and the partitioning of sediment particles at the shoreline, and the deposition of sediments and sedimentary evolution in coastal environments. Research into elements of coastal hydrology and the character of changes in relative sea level are included in these studies. For example, we are studying the evolution of Long Island Sound, the coastal processes at the south shore of Long Island, and the processes of resuspension and deposition of fine-grained sediments.

Much of this research is directly applicable to problems of coastal zone management. I am interested in applying my research to the problems of shore erosion, the dispersion of contaminants, siltation, dredging and disposal of the dredged sediments, and marine mining.

Bokuniewicz, H.J. Analytical description of subaqueous groundwater seepage. Estuaries (in press).

Gayes, P.T.; Bokuniewicz, H.J. Estuarine paleoshorelines in Long Island Sound, NY. Journal of Coastal Research 11:39-54; 1992.

Kim, B.H.; Bokuniewicz, H.J. Estimates of sediment fluxes in Long Island Sound Estuaries 14:237-247; 1991.

Bokuniewicz, H.J.; Pavik, B. Groundwater seepage along a barrier island. Biogeochemistry 10:257-276; 1990.

Bokuniewicz, H.J. Sand mining in New York Harbor. Marine Mining 7:7-18; 1988.

Malcolm J. Bowman

Professor
Ph.D., 1970
University of Saskatchewan

My current research interests are the dynamics of coastal fronts, eddies, river plumes, island wakes, and coastal sea straits.

I am collaborating on an interdisciplinary study in the coastal seas of Barbados, West Indies to study island wake eddies and circulation, and their interaction with the life cycle of tropical reef fish.

Bowman, M.J.; Visser, A.W.; Crawford, W.R. The Rose Spit Eddy: evidence for its existence and underlying dynamics. Atmosphere-Ocean 30:70-93; 1992.

Visser, A.W.; Bowman, M.J. Lagrangian tidal stress and basin-wide residual eddy dynamics in wide coastal sea straits. Geophysical and Astrophysical Fluid Dynamics 59:113-145; 1991.

Visser, A.W.; Bowman, M.J.; Crawford, W. R. Dynamics of tidally forced basin-wide coastal eddies. In: Cheng, R., ed. Residual currents and long-term processes in shallow estuaries and bays. Coastal and Estuarine Studies; New York: Springer-Verlag; 1989.

Vincent Breslin

Research Assistant Professor
Ph.D., 1986
Florida Institute of Technology

My research activities primarily focus on understanding the chemical behavior of both particulate and stabilized combustion wastes in the coastal ocean. Along with other Waste Management Institute researchers, I have been working to identify the mechanisms that influence the ability of metals to leach from combustion ashes in seawater. By understanding the chemical behavior of these ashes in sea water, we can better assess the potential impacts of these wastes in the ocean.

Thus far, our research has shown that the release of metals from the ashes can be controlled through the process of stabilization using additives to form blocks. These blocks were used to create artificial reefs in our coastal waters, including Conscience Bay in Long Island Sound.

I am also conducting research with other members of the Waste Management Institute to determine the rate and extent of deterioration of degradable plastics in the environment. We placed samples of starch-plastic composites in seawater, the strawline of a beach, compost, landfill, and soil. We periodically retrieved samples to conduct a variety of physical and chemical tests. Results of this research program will be useful in defining the role of degradable plastics in waste management.

My students and I are also examining the environmental susceptibility of mixed waste compost products for use as soil conditioners. Organic-rich wastes including sewage sludge, municipal solid waste, and yard waste, are used currently either individually or co-composted to produce soil conditioners. However, toxins present in these materials may be enriched in the resultant compost product. Our research program is designed to examine the physical and chemical properties of mixed waste compost products, determine both the inorganic and organic composition of

compost leachates, and assess the use of mixed waste compost in the commercial production of turfgrass.

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V. Monica Bricelj

Assistant Professor
Ph.D., 1984
State University of New York
at Stony Brook

My research interests lie in the areas of physiological ecology, bioenergetics, population biology and aquaculture of benthic macrofauna, especially commercially exploited bivalve molluscs. In recent years, my research efforts have been directed towards (1) investigating the interactions between phytoplankton (microalgae) and filter feeding herbivores such as mussels and clams and (2) studying factors that influence survival and growth of post-settlement bivalves in seagrasses.

Noxious algal blooms exert a major impact on the production of filter feeding shellfish populations. In turn, their grazing may contribute towards regulating phytoplankton populations in shallow coastal bays. "Brown tides" experienced in Long Island waters since the mid-1980s, and "red tides," which impact coastal shellfisheries worldwide, are only two well-publicized examples of such blooms. Using cultured dinoflagellates of varying cell toxicity, we are modeling the kinetics of toxin uptake and depuration by shellfish and investigating the transfer of toxins through the food chain.

Recently, the impact of paralytic shellfish poisoning has extended to the offshore fishery for surf clams on Georges Bank. Our future studies will therefore focus on the transfer and metabolic transformations of dinoflagellate toxins in surf clams, which are known to retain toxins for extended periods.

"Brown tides" have decimated the bay scallop fishery on Long Island and reduced the biomass and extent of eelgrass cover, which provides an important nursery habitat for many benthic organisms. In turn, predation is the single most important source of natural mortality of juvenile bivalves. We are currently investigating the role of eelgrass in providing post-settlement scallops with a refuge from benthic predators (primarily crab species) in Long Island bays. This research will be applied towards the optimization of reseeding programs required to rehabilitate the bay scallop fishery in several east coast states.

Bivalves experience high mortalities during larval and postlarval development, especially following metamorphosis, during transition from a planktonic to benthic mode of life. We are conducting a study to determine the relative vulnerability of early life history stages of oysters to nutritional stress and their use of catabolic substrates during development.

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Pohle, D.G.; Bricelj, V.M.; García-Esquivel, Z. The eelgrass canopy: an above-bottom refuge from benthic predators for juvenile bay scallops, *Argopecten irradians*. Marine Ecology Progress Series 74: 47-59; 1991.

Bricelj, V.M.; Krause, M.K. Resource allocation and population genetics of the bay scallop, *Argopecten irradians* effects of age and allozyme heterozygosity on reproductive output. Marine Biology 113:253-261; 1992.

Bruce Brownawell

Assistant Professor
Ph.D., 1986
Massachusetts Institute of Technology/
Woods Hole Oceanographic Institution

I am interested in biogeochemical processes that affect the transport and fate of organic compounds in coastal, estuarine, and groundwater environments. I have been particularly interested in the aquatic chemistry of hydrophobic pollutant compounds. Understanding the biogeochemistry of pollutant compounds is important for managing coastal zone and groundwater resources and for remediating already contaminated sites.

Anthropogenically derived compounds can also provide valuable analogs for understanding the cycling of naturally produced organic compounds in the ocean. My research has focused on the behavior and transport of a variety of neutral, ionizable, and ionic compounds. In these studies I have been concerned with elucidating adsorption mechanisms of various compound classes with either sediments, soils, aquifer materials, or dissolved organic matter. Development of methods for determining activities of organic compounds in natural waters has been an important aspect of my work.

The questions that I am interested in addressing center around how the physical and chemical form of organic compounds (i.e., dissolved, bound, or complexed) affects their transport, availability to organisms, and the rates at which they are transformed chemically or by bacteria. I have interests in selected research topics in several additional areas, including atmospheric deposition of organic chemicals, aquatic photochemistry, and the biogeochemistry of surface sediments and groundwater environments.

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Brownawell, B.J. The role of colloidal organic matter in the marine geochemistry of PCBs. Ph.D. Thesis, Woods Hole Oceanographic Institute/Massachusetts Institute of Technology Joint Program in Oceanography; 1986.

Brownawell, B.J.; Farrington, J. W. Biogeochemistry of PCBs in interstitial waters of a coastal marine sediment. Geochimica et Cosmochimica Acta 50:157-169; 1986.

Edward J. Carpenter

Professor
Ph.D., 1969
North Carolina State University

Our group has two major interests. One concerns nitrogen fixation in the sea. We work in tropical and subtropical waters on the biology and ecology of nitrogen fixation in the cyanobacterium *Trichodesmium*. Recently we have begun to use remote sensing techniques to study its distribution and factors affecting bloom phenomena.

Our second major interest centers on the measurement of species-specific growth rates of phytoplankton in the sea. We are attempting to determine factors that limit phytoplankton growth, as well as to understand the role of a species as a primary producer. This research requires a field program to collect phytoplankton and environmental data, and laboratory measurements on the samples using markers of various stages in the cell cycle, and epifluorescence and video microscopy to determine growth rates.

Carpenter, E.J. Nitrogen fixation in the epiphyllae and root nodules of trees in the lowland tropical rainforest of Costa Rica. Acta Œcologica 13(2): 153-160; 1992.

Carpenter, E.J.; Capone, D.G. Significance of *Trichodesmium* blooms in the marine nitrogen cycle. In: Carpenter, E.J.; Capone, D.G.; Rueter, J., eds. Marine Pelagic Cyanobacteria: *Trichodesmium* and other Diazotrophs. Dordrecht: Kluwer Academic Publishers; pp. 211-217; 1992.

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Robert M. Cerrato

Associate Professor
Ph.D., 1980
Yale University

My research centers primarily around population and community dynamics of benthic animals. My students and I have been using information preserved as structural and morphological features in bivalve shells in a number of population studies. Recent and ongoing work includes studies of the population dynamics of three species (*Mya arenaria, Mercenaria mercenaria* and *Spisula solidissima*); an investigation of growth line periodicity in larval and postlarval bivalve shells; development of statistical approaches useful in bivalve population studies; and, using shell remains from middens on Shelter Island, the reconstruction of shellfish seasonal harvesting patterns by prehistoric hunter-gatherers. In the future, I hope to examine more closely the relationship between shell microgrowth patterns and physiological rate processes in bivalves.

With other MSRC faculty, I have also been studying the feasibility and environmental effects of several alternatives proposed for the disposal of dredged material in New York Harbor. As part of this research program, we have completed an extensive regional study of the benthos in Lower Bay of New York Harbor. This study was specifically designed to match the disparate sampling methods used in prior surveys of the bay conducted over the past 35 years. Analysis on this data base is allowing us to examine for the first time the detailed spatial and temporal structure of the benthos in Lower Bay.

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Cerrato, R.M. Analysis of nonlinearity effects in expected-value parameterizations of the von Bertalanffy equation. Canadian Journal of Fisheries and Aquatic Science 48:2109-2117; 1991.

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Lightfoot, K.G.; Cerrato, R.M. Regional patterns of shellfish harvesting along the Atlantic Coast of North America. Archaeology of Eastern North America 17:31-46; 1989.

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Robert D. Cess

Distinguished Professor
Ph.D., 1959
University of Pittsburgh

My research concentrates on two areas. One concerns theoretical and modeling studies of climate feedback mechanisms that can either amplify or diminish global climate change. A quantitative understanding of such mechanisms is a prerequisite to being able to project climate change caused by anthropogenic factors such as increasing greenhouse gases.

The second research area augments the first and concerns the acquisition and interpretation of both surface and satellite radiometric data. Thus, I have been involved with NASA's Earth Radiation Budget Experiment; their subsequent Clouds and the Earth's Radiant Energy System, which is part of the Earth Observing System; and DOE's Atmospheric Radiation Measurements Program. The focus of these observational programs is to obtain a better understanding of how clouds impact the present climate, so as to improve our capability of predicting how clouds impact climate change.

Cess, R.D.; Nemesure, S.; Dutton, E.G.; DeLuisi, J.J.; Potter, G.L.; Morcrette, J.-J. The Impact of clouds on the shortwave radiation budget of the surface-atmosphere system: interfacing measurements and models. Journal of Climate 6:308-316; 1993.

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Jeng Chang

Research Assistant Professor
Ph.D., 1989
State University of New York at Stony Brook

My primary research interest is to understand the dynamics of phytoplankton communities on a species-specific basis using newly developed single-cell techniques. Ecological processes currently under investigation include seasonal succession and inter-species competition. Another project in this laboratory is to improve and expand the method of cell cycle analysis, a single-cell technique developed here.

I have developed and tested the method of cell cycle analysis during the past several years to measure species-specific growth rates in the natural environment. This technique reveals a cell's progress in the cell division cycle by determining its DNA content with a quantitative microscope system. DNA histograms generated this way can be used to predict the number of cells that will perform mitosis, and to estimate in situ the potential for a phytoplankton population to grow.

To improve the original method, we are exploring cell cycle markers other than DNA content. My group is searching for proteins that only appear at certain stages of the cell cycle using biochemistry and molecular biology techniques. Later, we will use immunocytochemical techniques to determine the cell cycle stage of individual cells according to the presence or absence of a particular protein.

This method of cell cycle analysis will be used to monitor the growth rate of major phytoplankton species starting from the spring of 1993. The goal of this field study is to understand whether the change in species composition from spring to summer is due to growth conditions in the water column or cell loss caused by grazing.

Chang, J.; Dam, H.G. The influence of grazing on the estimation of phytoplankton growth rate via cell cycle analysis: modeling and experimental evidence. Limnology and Oceanography; in press.

Chang, J; Carpenter, E.J. Species-specific phytoplankton growth rates via diel DNA synthesis cycles. V. Application to natural populations in Long Island Sound. Marine Ecology Progress Series 78:115-122; 1991.

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J. Kirk Cochran

Professor,
Associate Dean for Research
Ph.D., 1979
Yale University

My research group and I are using natural radionuclides, as well as those produced by activities such as atomic weapons testing, to study earth surface processes. The fact that different chemical elements are represented in the suite of radioactive nuclides permits studies of chemical behavior, and the property of radioactivity provides a clock with which to measure rates. Research Scientist David Hirschberg and I are using naturally occurring thorium isotopes to determine rates of particle cycling in the open ocean. This work, part of the Joint Global Ocean Flux Study, has as its goal an understanding of the fate of carbon in the ocean. The thorium isotopes provide a means of determining particle (and carbon) fluxes from the upper ocean. In coastal waters and estuaries like Long Island Sound, naturally occurring radionuclides provide tracers to determine rates of removal of contaminants from the water column.

We are also evaluating the importance of the atmosphere as a pathway for trace metals and organic contaminants to the Long Island Sound by using salt marshes as a recorder of the atmospheric inputs of metals to the estuary. Our results show that most of the lead, and significant amounts of copper and Zinc in the sediments of the Sound are supplied by the atmosphere.

Barnes, C.; Cochran, J.K. Uranium geochemistry in estuarine sediments: controls on removal and release process. Geochimica et Cosmochimica Acta 57: 555-569; 1993

Buesseler, K.O.; Bacon, M.P.; Cochran, J.K.; Livingston. H.D. Carbon and nitrogen export during the JGOFS North Atlantic Bloom Experiment estimated from Th-234:U-238 disequilibria. Deep-Sea Research 39: 1115-1137; 1992.

Cochran, J. K. The oceanic chemistry of the U- and Th-series nuclides. In: Ivanovich, M.; Harmon, R., eds. Uranium series disequilibrium-application to environmental problems. 2nd Edition, Oxford University Press 334-395; 1992.

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Landman, N.H.; Cochran, J.K.; Chamberlain, J.A.; Hirschberg. D.J. Timing of septal formation in two species of *Nautilus* based on radiometric and aquarium data. Marine Biology; 102:65-72; 1989.

Daniel Conley

Assistant Professor
Ph.D., 1993
University of California at San Diego/
Scripps Institution of Oceanography

My primary research interests are in nearshore physical and geological oceanographic processes. In particular, I am interested in interactions between fluids and sediments and how those interactions control nearshore morphology. Recently, this has meant concentration on wave and current-driven bottom boundary layers. My approach is to combine field and laboratory measurements to advance our understanding of these fundamental processes and to exploit these advances to develop better tools to model these complex systems.

I intend to expand my research to include the behavior of other two phase systems, which would lead to better understanding of the nearshore transport of other constituents such as nutrients and contaminants. Long Island is one of the best natural laboratories in the world to pursue these kinds of studies.

Conley, D.C. Ventilated oscillatory boundary layers. Ph.D. dissertation, Scripps Institution of Oceanography, University of California, San Diego; 1993.

Conley, D.C.; Inman, D.L. Field observations of the fluid-granular boundary layer under nearbreaking waves. Journal of Geophysical Research 97(C6):9631-9643; 1992.

David O. Conover

Associate Professor
Ph.D., 1982
University of Massachusetts

My research interests involve the ecology and evolutionary biology of fishes and fisheries science. I seek to understand the adaptive significance of reproductive, behavioral, physiological, or life history traits in fishes and to extend this knowledge to fundamental problems in resource management.

One interest of mine is to understand how the sex ratio evolves. I have been the first to show that sex determination in fishes is influenced by temperature during larval development. Most of this work has involved the Atlantic silverside, *Menidia menidia*, but the phenomenon is probably widespread. These findings are important not only in designing approaches to sex ratio manipulation in aquaculture, but also to understanding the causes of fluctuations in sex ratio among natural populations.

Another project concerns the recruitment of juvenile bluefish *(Pomatomus saltatrix)* to estuaries along the U.S. East Coast. My students and I are testing the hypothesis that young bluefish acquire a predatory size advantage over their principal prey by virtue of being spawned offshore early in the year and invading estuaries of the Middle Atlantic Bight at an advanced size, just as the growing season of the local prey species is beginning.

A new area of investigation concerns how growth rate is adapted to differences in seasonality that occur with latitude. In several species distributed along the east coast of North America, the length of the growing season declines with increasing latitude by a factor of about three. Yet body size at the end of the growing season is independent of latitude. Experimental studies on laboratory-reared fish explain this paradox: high-latitude fish have a higher genetic capacity for growth and grow two to three times faster within the growing season than do low-latitude fish. This "countergradient variation" in growth

rate appears to be widespread and may provide a general model for choosing natural stocks to be used in aquaculture: natural populations with the highest capacity for growth may be found where the growing season is shortest.

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Conover, D.O. The relation between capacity for growth and length of growing season: evidence for and implications of countergradient variation. Transactions of American Fisheries Society; 119:416-430; 1990.

Conover, D.O.; Present, T.M.C. Countergradient variation in growth rate: compensation for length of the growing season among Atlantic silversides from different latitudes. Oecologia 83:316-324; 1990.

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Nyman, R.; Conover, D.O. The relation between spawning season and the recruitment of young-of-the-year bluefish *(Pomatomus saltatrix)* to New York. Fishery Bulletin 86(2):237-250; 1988.

Conover, D.O.; Heins, S.W. Adaptive variation in environmental and genetic sex determination in a fish. Nature 326:496-498; 1987.

Alessandra Conversi

Research Assistant Professor
Ph.D., 1992
University of California at San Diego/
Scripps Institution of Oceanography

I have been involved for a long time with various approaches to the evaluation of anthropogenic impact on marine systems.

Originally I investigated the uptake and loss in the crab *Pachigraspsus marmoratus* of a radionuclide (technetium), which has been introduced into the ocean by human activities.

I later expanded the scale of my interest and focused on a problem which I consider central to the evaluation of pollution impact in the field: the distinction between man-induced variability from the natural variability of ocean properties.

This generated my interest in time-series. I studied the variability of four water quality parameters (temperature, oxygen, transmissivity, Secchi disk transparency) collected over 15 years in the Southern California Bight, around three major sewage outfalls. I found that some signals were common to the entire Bight and could not be related to discharge.

More recently I have become involved in the processes that translate science into governmental policy.

Conversi A.; McGowan, J.A. Variability of water column transparency, volume flow and suspended solids near San Diego sewage outfall (California): 15 years of data. Chemistry and Ecology 6:133-147; 1992

Mullin M.M.; Conversi, A. Biomass of euphausiid and smaller zooplankton in the California Current geographic and interannual comparisons. Fisheries Bulletin 87(3): 633-644; 1989.

Conversi A. Uptake and loss of technetium 95-m in the crab *Pachygraspsus marmoratus*. Journal of Environmental Radioactivity 2(2):161-170; 1985.

Elizabeth M. Cosper

Research Associate Professor
Ph.D., 1981
City University of New York
City College

I am generally interested in the physiological ecology of marine phytoplankton. My research mainly involves the use of experimental laboratory systems to address environmental problems that are difficult to assess under field conditions.

In the past my research has involved a study of the effects on the production of a common marine diatom of fluctuation in light on natural time scales of variability. More recently, my research has centered on the factors affecting the ability of marine phytoplankton to develop resistance to toxic chemical pollutants and the ecological consequences of the development of this resistance. Concomitantly, one of my students and I have conducted studies of the significance of resting states of diatoms to their population dynamics and adjustment to stressful conditions, both natural and anthropogenic in origin.

Most recently, several of my students and I have become involved in both field and laboratory research into the causes of the "brown tide" blooms which have plagued Long Island embayments since 1985. I have isolated this microalga into culture and, along with other researchers at MSRC, we are conducting studies of its growth physiology to better explain its explosive growth during the summer months in local bay waters. We are also investigating any environmental conditions that could have contributed to the blooming of this previously undescribed phytoplankton species.

Cohen, M.K.; West, A.S.; Cosper, E.M.; Wurster, C.F. Mechanisms of resistance to polychlorinated biphenyls (PCB) in two species of marine diatoms. Journal of Marine Biology Association UK; 71; 1991.

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Cosper, E.; Snyder, B.J.; Arnold, L.M.; Zaikowski, L.A.; Wurster, C.F. Induced resistance and altered environmental fitness in a marine diatom. Marine Environmental Research 23:207-222; 1987.

Robert K. Cowen

Associate Professor
Ph.D., 1985
University of California at San Diego/
Scripps Institution of Oceanography

My main research interests are centered on the biological and physical factors that influence recruitment of nearshore fish populations. In particular, I am studying the various mechanisms that coastal fish species utilize to return their larvae from the open sea to coastal habitats. This work involves a very integrated approach whereby the biology of the organisms, their larval distribution, and the physical oceanography must be studied concurrently.

My laboratory is presently working on three separate projects. The first is focused on the oceanic transport of larval fish, with particular emphasis on bluefish *(Pomatomus saltatrix)* within the Middle Atlantic Bight. We are interested in both cross-shelf transport and larger scale processes involving the transport of fish from south of Cape Hatteras into the local New York waters.

The other two projects concern recruitment processes of coral reef fish within Caribbean waters. One of these, in collaboration with Malcolm Bowman, concerns the retention of larval fish in the lee of islands, specifically, Barbados. We are testing whether or not eddies are important in the entrapment and eventual return of larval fish to the reef habitat, and if not, then what features of the local current regime are important in the retention of larvae. My lab is also working in St. Croix, U.S. Virgin Islands, where we are examining the movement and size of patches of larval fish just prior to their settlement on shore.

We are also interested in the length of time various larvae are capable of remaining in their pelagic phase. Through the study of the microstructure of otoliths (small ear bones) of larval fish, the duration of their various developmental stages can be determined and then compared among species with respect to their offshore distribution.

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Cowen, R.K. Large scale pattern of recruitment by the labrid, *Semicossyphus pulcher*: causes and implications. Journal of Marine Research 43:719-742; 1985.

Robert G. Currie

Research Associate Professor
Ph.D., 1966
University of California at Los Angeles

Although formally trained in solid earth geophysics, most of my work has involved signal processing of diverse sets of time sampled data. Signal processing involves spectrum analysis, convolution, deconvolution, etc. and is a discipline in electrical and electronic engineering.

In the past my research has involved analysis of geomagnetic and aeromagnetic survey data, reflection seismic records for oil exploration, as well as astronomical, earthquake, and other geophysical time series. Such series contain both narrow band (line spectra) and broad band signals.

More recently I have been working on time series simulated in Global Circulation Models (GCM) of the atmosphere, as well as diverse sets of measured climate parameters (air pressure, air temperature, rainfall, height of sea level, etc.). Surprisingly, it was found that spectra of GCM-simulated air pressure are extremely rich in lines. Aside from the seasonal term at 12 months and its first five harmonics (6, 4, 3, 2.4, 2 months), the well known quasi-biennial oscillation of period approximately 26 months, a less well known line at approximately 40 months, and a signal with period of approximately months, corresponding to the Chandler wobble of the solid earth were found. These latter three signals interact with the seasonal term and its harmonics to produce a rich spectrum of tones which can be explained in terms of elementary physics, the only requirement being that the atmosphere is weakly non-linear.

I have investigated existing methods of adjusting climate records such as rainfall to correct for changes in site, changes in instruments, etc., and found that the problem is model-dependent and more problematic than was recognized. I have also investigated the spectrum of climate from two to 20 years.

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Currie, R.G.; O'Brien, D.P. Deterministic signals in USA precipitation records: Part II. International Journal of Climatology 12:281-304; 1992.

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Currie, R.G.; Hameed, S. Evidence of quasi-biennial oscillations in a general circulation model. Geophysical Research Letters 15:649-652; 1988.

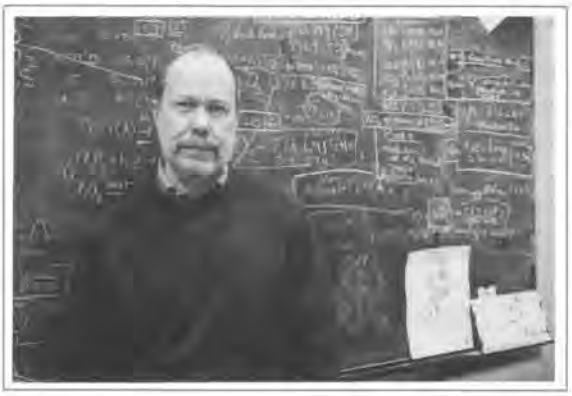
Robert L. de Zafra

Professor
Ph.D., 1958
University of Maryland

I am a physicist who has been concerned with measuring chemical depletion of the stratospheric ozone layer for well over a decade. I and colleagues at Stony Brook developed a unique ground-based remote sensing spectrometer, able to identify and quantitatively measure molecular rotational emission spectra from stratospheric trace gases present in as little as a few tenths of a part per billion of ambient air pressure. With this instrument, we have been measuring and monitoring the destructive effects of chlorofluorocarbons on stratospheric ozone since 1981.

In 1986, we obtained the first proof, from data we collected in Antarctica, that the seasonal "Ozone Hole" discovered over that continent was caused by chlorine from chlorofluorocarbons, rather than other suggested reasons. Since 1986, I have returned four times to Antarctica (1987, 1991, 1992, and 1993) and have gone twice (1992 and 1993) to the Arctic with members of my research group to make further measurements and comparative studies of stratospheric chemistry and dynamics in the two polar regions.

I also have an ongoing concern with instrumentation, and much of the time between field trips is spent by me and my students in expanding the capabilities and improving the sensitivity of our two remote-sensing spectrometers. We are incorporating state-of-the-art technology in mm-wave receivers and other aspects of our instrumentation. The multidisciplinary requirements of our research give students a wide range of topics to work on.



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Nicholas S. Fisher

Professor
Ph.D., 1974
State University of
New York at Stony Brook

My research is concerned with the interactions of marine organisms with toxic chemicals. Most of these biogeochemically oriented studies focus on marine plankton and their interactions with select metals and long-lived radionuclides emanating from the nuclear fuel cycle. I explore the bioaccumulation and trophic transfer of chemicals, their impacts on the organisms, and the roles that the organisms play in mediating the cycling and vertical transport of these chemicals in the ocean. Experimentation generally employs radiotracer methodology, which enables working with environmentally realistic metal concentrations.

My research group and I are conducting experiments to determine the accumulation and cellular localization of metals in marine phytoplankton cells, the assimilation of metals in herbivorous animals, the gut pH of different types of planktonic herbivores, the bacterial degradation rate of different forms of biogenic debris, and the influence of these processes on the retention of metals in this debris. I am also currently trying to incorporate new production models to quantitatively assess the influence of different forms of sinking biogenic debris in vertically transporting metals in different water columns.

My other research interests include phytoplankton physiology and ecology, phytoplankton-herbivore interactions, the nature of element binding to particle surfaces, marine colloids, and metal geochemistry

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Roger D. Flood

Associate Professor
Ph.D., 1978
Massachusetts Institute of Technology/
Woods Hole Oceanographic Institution

I am presently studying sedimentation in several marine and fresh water environments. I am particularly interested in the use of high-resolution methods, including geophysical techniques (side-scan sonar, seismic profiling, shear-wave analysis, and bathymetry); photography; submersible and diver sampling; and sediment analysis, to provide new insights into sedimentary processes. My current research interests focus on processes in active sedimentary environments (including the deep sea, continental margins, large lakes, and estuaries) and with the study of bedforms in cohesive sediment.

Recently, my students and I have been studying the structure and development of submarine fans on the continental margin. These major sediment bodies contain much of the sediment eroded from continents during sea level lowstands. Our intensive geophysical and sedimentological studies have demonstrated some of the complexity of these systems and helped to clarify processes responsible for fan development. Also, recent bedform studies have been conducted in the deep sea along the U.S. continental margin and in the Argentine Basin, in the Great Lakes, and in the Hudson River. Bedforms created by fluid flows can be used to understand both local and regional sediment transport and depositional patterns. Our studies help to understand both the complex flow-sediment interactions that cause and maintain bedforms in cohesive sediments and bedform-animal interactions.

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Manley, P.L.; Flood, R.D. Cyclic development within the Amazon deep-sea fan. American Association of Petroleum Geologists 72:912-925; 1988.

Jane L. Fox

Professor
Ph.D., 1978
Harvard University

My research group is involved with numerical modeling of the chemical and thermal structures, luminosity, and evolution of the thermospheres-ionospheres of the Earth and planets. Recently, an important focus has been the nightside ionosphere of Venus and the ultraviolet "auroral" emissions observed there by the Pioneer Venus spacecraft. We have suggested that the emissions are produced by impact of soft electrons that have been observed in the umbra of the planet, and we are modeling the electron-energy deposition to determine their spectrum. Using a combination of modeling and analysis of ion composition data from Pioneer Venus, we hope to elucidate the relative roles of electron impact and ion transport in producing the nightside ionosphere.

We are also investigating the ionospheric structure, odd nitrogen chemistry, and evolution of the Martian atmosphere. The increased knowledge of the ionosphere of Venus gained from Pioneer Venus has enabled us to better understand the Martian ionosphere, which has a similar composition, but for which there are fewer measurements. The $^{15}N/^{14}N$ ratio measured by the Viking spacecraft showed that the ratio is enhanced over that found in the terrestrial atmosphere, presumably due to selective escape of ^{14}N. We have modeled the non-thermal escape processes over the age of the solar system to determine the initial nitrogen inventory.

The Jovian ionosphere has also been a focus of our research, especially the hydrocarbon ion chemistry, H_3^+ densities and vibrational distributions. Infrared emissions, which have been attributed to vibrational transitions of H_3^+, have been observed from the Jovian polar regions in the 2-4μm range. We have modeled the vibrational distribution of H_3^+ in order to identify the production mechanisms, and predicted the emission rates. In collaboration with

Dr. Roger Yelle at the University of Arizona, we are studying the ionospheric composition and structure, odd nitrogen chemistry, and heating efficiencies in the thermospheres of Titan and Triton, which are satellites of Saturn and Neptune, respectively.

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Kim, Y.H.; Fox, J.L. The Jovian ionospheric E region. Geosphysical Research Letters 18:123; 1991.

Fox, J.L. The red and green lines of atomic oxygen in the nightglow of Venus. Advances in Space Research 10(5):31; 1990.

Marvin A. Geller

Professor
Ph.D., 1969
Massachusetts Institute of Technology

I first became fascinated with the study of atmospheric dynamics in graduate school. Since that time, my main research has been on the dynamics of the middle atmosphere, the stratosphere and mesosphere, and how these motions transport such constituents as ozone. I do theoretical modeling work and also observational analysis on these topics. It is important to be very cognizant of observational results when doing theory and being equally as cognizant of theoretical results when analyzing observations.

My work on upper atmosphere dynamics leads me to use satellite data, since much of the middle atmosphere lies above the reach of conventional weather balloon data. In particular, a great deal of my present effort is focused on the analysis of data from NASA's Upper Atmosphere Research Satellite (UARS). UARS data on solar radiation and energetic particle flux, atmospheric composition, and winds are available on the UARS Remote Access Computer at Stony Brook. To me, the availability of new data coupled with the use of state-of-the-art models on a topic as interesting and important as stratospheric ozone represents a rare scientific opportunity.

Another facet of my research involves the interaction of the atmospheric water cycle with dynamics. Solar heating of the oceans leads to intense precipitation in the tropics. The liberation of the latent heat of condensation connected with this tropical precipitation represents the principal energy source for atmospheric motions. As an investigator on the joint Japanese/NASA Tropical Rainfall Measuring Mission (TRMM) to be launched in 1997, I am looking into ways to use this new data source to better understand these interactions between the water cycle and atmospheric dynamics.

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Valrie A. Gerard

Associate Professor
Ph.D., 1976
University of California, Santa Cruz

My research interests focus on the ecology and physiology of seaweeds, particularly species which are important as primary producers in marine ecosystems or as commercial aquaculture crops. Much of my recent research examines genetic variation among populations of the common kelp, *Laminaria saccharina*, which occurs throughout the northern hemisphere. The wide geographic range of this species is partly due to its ability to adapt genetically to different environmental conditions.

I have identified several genetic varieties, or ecotypes, of *L. saccharina* from Long Island Sound and the New England coast. These ecotypes show different responses to light and temperature conditions, and genetic differences are expressed in both the large, spore-producing phase and the microscopic, sexual phase of the life-cycle. My next step will be to explore the physiological and biochemical mechanisms underlying genetic adaptation to high temperature.

Several other research projects have been conducted in my laboratory recently. One project developed a computer model to predict the population dynamics of giant kelp in California. Another project examined the relationship between nitrogen-fixing cyanobacteria and the green seaweed *Codium fragile*. A third project determined effects of high-frequency light fluctuations on the carbon metabolism of the red seaweed, *Chondrus crispus*. An ongoing research project will determine whether environmental stress that occurs during the early developmental stages of a seaweed influences the physiology and growth of that plant later on in its life.

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Gerard, V.A.; Dunham, S.; Rosenberg, G. Nitrogen-fixation by cyanobacteria associated with *Codium fragile* (Chlorophyta): environmental effects and transfer of fixed nitrogen. Marine Biology 105:1-8; 1990.

Greene, R.M.; Gerard, V.A. Effects of high-frequency light fluctuations on growth and photoacclimation of the red alga, *Chondrus crispus*. Marine Biology 105:337-344; 1990.

Gerard, V.A. Ecotypic differentiation in light-related traits of the kelp, *Laminaria saccharina*. Marine Biology 97:25-36; 1988.

Gerard, V.A.; K. Du Bois. Temperature ecotypes near the southern boundary of the kelp, *Laminaria saccharina*. Marine Biology 97:575-580; 1988.

Gerard, V.A. Hydrodynamic streamlining of *Laminaria saccharina* Lamour. \in response to mechanical stress. Journal of Experimental Marine Biology and Ecology 107:237-244; 1987.

Gerard, V.A.; Du Bois, K.; Greene, R. Growth responses of two *Laminaria saccharina* populations to environmental variation. Hydrobiologia 151:229-232; 1987.

Theodore D. Goldfarb

Professor
Department of Chemistry,
Joint with MSRC
Ph.D., 1959
University of California, Berkeley

In recent years my research interests have shifted from physical chemical investigations of the structure and reactivity of molecules to the application of physical chemical methods to real world environmental problems. The pollution problems resulting from the use of agricultural chemicals, the production of energy, and the disposal of waste encompass the range of issues that I have joined with scientists in other disciplines to explore.

Our present activities are focused on the environmental consequences of alternative means of addressing the need to dispose of both municipal and industrial waste, including incineration, waste reduction, reuse, composting, and recycling. Related to this work is my interest in the interactions between science and public policy.

Goldfarb, T.D. The commercialization of nuclear power - unethical behavior on a grand scale. In: Hart, R.E., ed. Ethics and the Environment; Lanham, MD: University Press of America; pp. 91-102; 1992.

Goldfarb, T.D. Comparing technologies - risk assessment revisited. MSW Management 2(2):30-pp. 30-39; 1992.

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Goldfarb, T.D.; Harrad, S.J. Consideration of the environmental impact of the volatilization of PCDDs and PCDFs. Chemosphere 23:1669-1674; 1991.

Goldfarb, T.D.; Maertz, M.; Roethel, F. J.; Iden, C.R.; Rieger, R. PCDDs and PCDFs in incineration ash from several types of facilities in the Northeastern United States. Chemosphere 20:1833; 1990.

Goldfarb, T.D. Evidence for post-furnace formation of PCDDs and PCDFs: implications for control. Chemosphere 18:1051; 1989.

Goldfarb, T.D.; Deutsch, D. PCDD/PCDF contamination following a fire in a university lecture hall building. Chemosphere 17:2423; 1988.

William H. Greene

Clinical Associate Professor of Medicine,
Division of Infection Control
Health Sciences Center,
Joint with MSRC
M.D., 1968
State University of New York Downstate

My research interests have evolved from that of infectious complications in patients with neoplastic disease to the more general area of infectious complications of hospitalized patients. This latter field, hospital-acquired infections, has traditionally also included infection prevention methods for health-care workers and visitors, as well as patients.

In turn, recent priorities in society have brought to the fore the management of medical waste, particularly the minimization of infectious hazards in its generation, transport, and disposal. My current research interests revolve around the clinical investigation of experimental antibiotics; the prevention of hospital-acquired infection, particularly of the respiratory tract; and the medical implications of waste handling for health-care workers, solid waste personnel, and communities surrounding landfills.

Donelan, S.; Singh, F.; Green, W. A staphylococcal nursery outbreak in circumcised males possibly related to photography by volunteers. Proceedings of the 2nd Annual Meeting of the Society for Hospital Epidemiology of America; Baltimore; 1992.

Marchese, J.T.; Marshall, G.B.; LaValle, R.F.; Greene, W.H. Regulated medical waste disposal at a university and university hospital: future implications. Preceedings, 3rd International Conference on Nosocomial Infections; Atlanta; August, 1990.

Sultan Hameed

Professor Ph.D., 1968
University of Manchester

My research interests focus on understanding the nature and causes of climatic changes. At this time, I am pursuing the following approaches:

1) Analysis of large scale climatic oscillations: multi-year simulations of climate by coupled ocean-atmosphere General Circulation Models have been analyzed to identify the signatures of Southern Oscillation, the North Atlantic Oscillation, the North Pacific Oscillation, the Quasi-Biennial Oscillation, and the Chandler Wobble as natural oscillations of the system. Present work is directed at diagnosing the physical processes underlying these phenomena.

2) Deterministic signals vs. noise in climate: contributions of the seasonal cycle in generating deterministic signals on the interannual and intra-annual time scales have been analyzed in multi-year GCM simulations and in observations. Current research aims to quantify the contributions of noise and deterministic influences on the fluctuations of a range of climatic variables.

3) Study of regional climates: global climate models have been found to be useful in the analysis of seasonal and interannual variation of precipitation in several regions of interest such as Northeast Brazil, Sahel, and Eastern China. Our present efforts are aimed at deciphering the physical processes that contribute to climate variations in these regions and identifying additional regions where presently available global models can be useful in the study of regional climatology.

4) Reconstruction of past climates by the use of proxy data in Chinese historical documents: histories of precipitation and temperature in Eastern China extending to 2,000 years ago have been analyzed. The role of the drought of 1627-1642 in the downfall of the Ming Dynasty was illustrated. Currently we are analyzing the impact of climatic changes on the historical development of China.

Hameed, S.; Sperber, K.R.; Meinster, A. Teleconnections of the Southern Oscillation in the tropical Atlantic sector in the OSU coupled upper ocean-atmosphere GCM. Journal of Climate (in press).

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Hameed S.; Currie, R.G. Simulation of the 14 month Chandler Wobble in a global climate model. Geophysical Research Letters 16:247-250; 1989.

Stewart Harris

Professor
College of Engineering and Applied Sciences
Joint with MSRC
Ph.D., 1965
Northwestern University

I am interested in transport processes that occur in a variety of situations of topical interest. Mainly, I study the diffusion of gases through some complex medium as occurs when the methane created in a solid waste landfill migrates into the surrounding neighborhood.

On a much finer scale, I am also concerned with the diffusion processes that are the basis for fabricating microelectronic circuits.

Harris, S. Interface motion for mass redistribution at small supersaturation. Journal of Chemical Physics 93:9031; 1990.

Harris, S. Microscopic theory for the diffusive evolution of an isoconcentration surface. Physical Review A42:3504; 1990.

Harris, S. Steady 2-D Brownian motion with an absorbing boundary. Physical Review A39:307; 1989.

Herbert Herman

Professor
Department of Materials Science
Joint with MSRC
Ph.D., 1961
Northwestern University

My research activities in ocean engineering involve principally marine materials. We have a long-term program underway aimed at the protection of materials at sea. Our work, much of which is supported by the U.S. Navy, involves the thermal spray metallization of structural steel, yielding long-term corrosion protection in a wide range of industrial and marine environments.

We also have a joint program with the New York and New Jersey Port Authority on corrosion protection of marine-related structures. Research and testing programs, with use of the above and related corrosion control techniques, are being carried out cooperatively with industrial and government organizations.

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Wang, H.G.; Herman, H. Structure and properties of plasma sprayed spinel. Ceramics Bulletin 68:97-102; 1989.

L. E. Koppelman

Professor
Center for Regional Policy Studies
Joint with MSRC
Ph.D., 1970
New York University

My major research over the past decade and a half generally has been concerned with the environmental policy aspects of regional planning and has been specifically directed towards coastal zone management. This has included being project manager over almost $20 million in directed research, including coastal regional planning, comprehensive water management, shoreline erosion practices, and related studies.

In addition to the development of legislation related to coastal zone management and the design of administrative mechanism for policy implementation, I am particularly involved in the development of synthesis techniques for relating coastal zone science into the regional planning process.

In October 1988 I was appointed Director of the Center for Regional Policy Studies, which currently is carrying out a number of research projects dealing with governmental productivity, strategic economic planning, and environmental planning. I also serve as Executive Director of the Long Island Regional Planning Board, and beginning April 1991 undertook staff responsibility for the Bicounty Temporary State Commission on Tax Relief for Long Island.

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Cindy Lee

Professor
Ph.D., 1975
University of California at San Diego/
Scripps Institution of Oceanography

My research is concerned with the distribution and behavior of biogenic organic compounds in the marine environment. Understanding how organic compounds behave requires knowledge of the biological, geological, and physical processes in the sea. Most biogenic organic compounds are produced in surface waters by phytoplankton as a result of photosynthesis. These compounds can enter the marine food chain by acting as food for bacteria or zooplankton. Organic compounds can also be affected by chemical and physical processes such as adsorption, photochemical degradation, and transport by currents. I am interested in the rates and mechanisms of the transformation reactions which occur as organic compounds are affected by these processes. To study transformation reactions, my students and I use radiolabeled compounds as tracers to simulate the behavior of naturally occurring compounds. We also identify and measure the amount of individual organic compounds present in the environment with analytical techniques like gas chromatography, mass spectrometry, and high performance liquid chromatography (HPLC).

I am interested in the behavior of organic compounds in all environments, particularly, sediments and waters of open ocean and coastal areas, salt marshes, and lakes, as well as the atmosphere above these areas. A knowledge of the behavior of biogenic organic compounds in the environment will help us in practical ways. For example, we can better understand the formation of coal and oil deposits if we know how organic matter is produced, decomposed, and preserved. We may also be able to use the behavior of naturally occurring organic compounds as models in predicting the behavior of organic pollutants in the environment.

Lee, C. Controls on organic carbon preservation: the use of stratified water bodies to compare intrinsic rates of decomposition in oxic and anoxic systems. Geochimica et Cosmochimica Acta 56:3323-3335; 1992.

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Jeffrey S. Levinton

Professor
Department of Ecology and Evolution
Joint with MSRC
Ph.D., 1971
Yale University

I am interested in a broad range of topics, all relating to marine benthic ecology and evolutionary biology. Most of my research has centered around the biology of deposit feeding marine invertebrates, including: the role of microbial and particulate organic food sources in their nutrition; the mechanics of deposit feeding and response to flow by bivalve mollusks; the role of depositing organic matter in the subsidy of deposit feeding populations.

I have recently initiated a study of the biomechanics, morphometrics, and molecular evolution of fiddler crabs of the genus *Uca* (Ocypodidae). The objective is to see how sexual selection and natural selection influence morphological evolution, particularly of the chelipeds. This research involves comparative study of the over 60 species of *Uca*, biomechanical studies of claw closing force, and DNA sequencing of slowly evolving genes, to establish order of divergence and associations between evolutionary rate and timing with the evolution of behavioral traits.

Finally, I am working on the evolution of metal resistance, with particular emphasis on the cadmium polluted Foundry Cove in the Hudson River. We are now investigating the physiological and molecular aspects of metallothionein evolution and are also using other molecular markers to study the degree of differentiation between metal-adapted and normal populations. With Nicholas Fisher and Glenn Lopez, I am also studying the cycle of release of metals from the cove and export to the Hudson River, especially with regard to biological influences.

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Levinton, J.S. The big bang of animal evolution. Scientific American pp. 84-91;1992.

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Levinton, J.S. Genetics, Paleontology, and Macroevolution; Cambridge University Press; 637 pp.; 1988.

Levinton, J.S. Marine Ecology; Englewood Cliffs: Prentice Hall; 526 pp.; 1982.

Darcy J. Lonsdale

Assistant Professor
Ph.D., 1979
University of Maryland

I study the ecology and physiology of estuarine invertebrates, particularly copepods. I am investigating phytoplankton-zooplankton coupling in several New York estuaries, including the Hudson River..

Using radioactive tracers, I hope to determine the rates at which carbon is being fixed during photosynthesis, where the carbon is moving through the food chain after it is incorporated into the algal cells, and what factors such as cell size and food quality influence the extent of phytoplankton-zooplankton coupling. Because a large percentage of the phytoplankton in these estuaries is too small to be efficiently utilized by larger zooplankton, I am also evaluating the importance of predation on ciliates and other microzooplankton in plankton dynamics.

Another area of my research addresses the ecological importance of overwintering in estuarine copepods. From laboratory studies, I have described a strategy by which adult females enter a "reproductive-resting" stage during late fall that allows them to overwinter and provide a first source of spring naupliar recruitment. Currently, I am investigating changes in copepod physiological rates, chemical composition, and gut-cell structure associated with this stage, and conducting a field study to test my "naupliar recruitment" hypothesis.

The graduate students in my laboratory are undertaking diverse research projects. One project is an investigation of the impact of changing food resources, particularly biochemical changes that may be associated with species succession of planktonic microalgae, on the recruitment of important coastal species of copepods.

Additional student projects include a study of the grazing impact of microzooplankton (e.g., ciliates) on phytoplankton communities, top predator effects

(e.g., gelatinous zooplankton) on estuarine plankton dynamics, and the mechanisms directing mating behavior in an harpacticoid copepod.

Weissman, P.; Lonsdale, D.J.; Yen, J. The effect of peritrich ciliates on the production of *Acartia hudsonica* (Pinhey) (Copepoda: Calanoida) in Long Island Sound. Limnology and Oceanography (in press).

Lonsdale, D.J.; Weissman, P.; Dobbs, F.C. A reproductive-resting stage in an harpacticoid copepod, and the significance of genetically based differences among populations. Bulletin of Marine Science (in press).

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Glenn R. Lopez

Professor
Ph.D., 1976
State University of
New York at Stony Brook

I am a benthic ecologist interested in many aspects of life in sediment. My students and I are exploring the enigma of head-down deposit feeders. These animals are exposed to low food, low oxygen, and high sulfide. We are also studying how deposit-feeding animals grow and the biological meaning of allometric shifts. Another topic is trophic transfer of toxic metals in estuarine systems.

Lopez, G.R. Absorption of microbes by benthic macrofauna by the C-14:Cr-51 dual labelling method. In: Kemp, P. et al., eds. Current Methods in Aquatic Microbial Ecology (in press).

Cheng, I-J.; Lopez, G.R. Contributions of bacteria and sedimentary organic matter to the diet of *Nucula proxima*, a deposit-feeding protobranchiate bivalve. Ophelia 34:157-170; 1991.

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Lopez, G.R. Comparative ecology of the macrofauna of freshwater and marine muds. Limnology and Oceanography; 33:946- 962; 1988.

Lopez, G.R.; Levinton, J.S. Ecology of deposit-feeding animals in marine sediments. Quarterly Review of Biology 62:235-260; 1987.

Kamazima M.M.Lwiza

Assistant Professor
Ph.D., 1990
University of Wales

My research interests are the structure and dynamics of the shelf-seas and remote sensing oceanography. With colleagues from the United Kingdom, I conducted a study of the dynamics of shelf-sea fronts in the North Sea . For the study we developed a technique capable of removing tides from ship-borne acoustic Doppler current profiler (ADCP) measurements.

Recently, I have been working on a project in the North Sea to map the sea bottom topography (with sand waves of up to 4 m high) using a multi-sensor approach. We are using a helicopter-born scatterometer (HELISCAT) to measure the sea surface roughness backscatter, complemented by ship and aircraft measurements. The aircraft takes sunglint images with an Air-borne Thematic Mapper (ATM), while the ship measures physical water properties and the near-surface current modulation.

Results show that accurate interpretation of radar images of sea surface roughness related to bottom topography, requires calm weather and non-stratified conditions. If the water is stratified, internal waves tend to develop and consequently phase-shift the location of the peaks of the backscattered signal.

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Lwiza, K.M.M.; Bigendako, P.R. Kunduchi tides. Tanzania Journal of Science 14:65-76; 1988.

James E. Mackin

Associate Professor
Ph.D., 1983
University of Chicago

My research emphasizes theoretical and practical aspects of organic matter and clay mineral diagenesis in marine sediments. The goal of this research is to determine the influence of reactions involving major phases of sediments on both present day ocean chemistry and sedimentary rock chemistry and mineralogy. I am, therefore, interested in solid-solid transformations as well as the behavior of solutes during early diagenesis in sediments. Field and laboratory experimental work are essential components of this research.

Mackin, J.E. Relationships between Si, Al, and Fe deposited on filter-covered glass substrates in marine sediments and in suspensions of sediments and standard clays. Marine Chemistry 25; 1989.

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Mackin, J.E.; Swider, K.T. Organic matter decomposition pathways and oxygen consumption in coastal marine sediments. Journal of Marine Research 4; 1989.

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Mackin, J.E.; Aller, R.C.; Ullman, W.J. The effects of iron reduction and nonsteady-state diagenesis on iodine, ammonium, and boron distribution in sediments from the Amazon continental shelf. Continental Shelf Research 8:363-386; 1988.

Steven G. Morgan

Assistant Professor
Ph.D., 1986
University of Maryland at College Park

One of the most salient features of the life histories of marine animals is that they produce dispersing larvae. A single adult typically hatches thousands or millions of microscopic larvae that disperse from the adult habitat, feed and develop in the plankton and then return to adult habitats where they metamorphose. Most larvae suffer great mortality from starvation, predation, or advection into areas which are unsuitable for survival of adults. Fisheries biologists and ecologists have long been interested in explaining underlying causes of variation in larval recruitment in order to forecast harvests of commercially important species and to model fundamental ecological processes that regulate the abundance of marine populations.

What intrigues me is how adult and larval phases of life cycles have evolved in concert to reduce mortality of larvae and ensure successful recruitment to adult populations. Specifically, I examine (1) physical, chemical, and biological processes that regulate the timing of reproduction, larval dispersal, and larval settlement; (2) selective forces in the plankton that shape life histories; and (3) ecological and evolutionary consequences of complex life cycles. I work on different ecological scales with invertebrate and vertebrate animals, in several tidal regimes and in various habitats including coral reefs, mangroves, salt marshes, estuaries, marine bays, exposed coasts and continental shelves.

For example, I have studied the impact of planktivory and physical factors on the timing of larval release, dispersal patterns and larval morphologies of crabs. I also have studied the hatching rhythms of populations of crabs from various tidal regimes in the Caribbean, Pacific, Atlantic, and Gulf of Mexico to demonstrate that these rhythms are highly plastic and entrained by local environmental cues.

Furthermore, I have investigated adaptations of pigmented larvae that enable them to survive countervailing selective forces of ultraviolet radiation and visually-feeding fishes in illuminated surface waters. Another aspect of my research program examines the intersection of physical processes and behavior on larval transport and recruitment of fishes, crustaceans and bivalves in areas ranging from continental shelves to estuaries. Lastly, I have evaluated and ranked the relative importance of nursery habitats for blue crabs by determining settlement rates of postlarvae and postsettlement growth and mortality of juveniles in each.

Morgan, S.G. Predation by planktonic and benthic invertebrates on larvae of estuarine crabs. Journal of Experimental Marine Biology and Ecology 163:91-110; 1992.

Morgan, S.G. Impact of planktivorous fishes on the dispersal, hatching and morphology of estuarine crab larvae. Ecology 71:1639-1652; 1990.

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Morgan, S.G. Selection on hatching rhythms and dispersal patterns of estuarine crab larvae: avoidance of physiological stress by larval export? Journal of Experimental Marine Biology and Ecology 113: 71-78; 1987.

Morgan S.G. Behavioral and morphological antipredatory adaptations of decapod zoeae. CEcologia 73:321-480; 1987.

Charles Nittrouer

Professor
Ph.D., 1978
University of Washington, Seattle

My research interests deal with understanding the formation of sedimentary strata in continental margin environments. The primary effort of my research group has been to examine environments of the continental shelf, but our work also extends to shallower (lagoon, tidal flat) and deeper (continental slope and rise) environments. An underlying philosophy is that emphasis should be placed on understanding strata formation where large amounts of sediment are accumulating in modern environments and where large amounts of sediment have accumulated in ancient environments. This has led much of our research effort toward fine-grained siliciclastic sediments tied to dispersal systems of rivers (e.g., Amazon, Columbia, Yangtze, Huanghe, Ebro, Po). In addition to these mid- and low-latitude studies, we have been working in the Antarctic (in particular, the Ross Sea and the peninsula area) to examine the contrasting character of glacial-marine sedimentation.

I am interested in documenting, within modern strata, sedimentary characteristics which will reach the geological record (e.g., grain size, mineralogy, sedimentary structure, seismic stratigraphy) and in examining how these characteristics are affected by physical and biological oceanic processes. A critical factor is the ability to evaluate temporal aspects of strata formation such as rates of accumulation, frequency of physical erosion, and rates of biological reworking. These parameters can be measured on time scales commensurate with oceanic processes by using several short-lived radioisotopes (Th-234, Pb-210, C-14) found in marine sediments.

The inclusion of geochemical, physical, and biological observations within sedimentological studies causes much of my research to be interdisciplinary in nature. Hopefully, the range of information obtained provides a more general understanding of strata formation and allows development of fundamental concepts that can be applied to other modern and ancient continental margins.

Nittrouer, C.A.; Wright, L.D. Transport of particles across continental shelves. Reviews in Geophysics 31 (in press).

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Nittrouer, C.A.; Coleman, J.M.; Flood, R.D.; Ginsburg, R.N.; Gorsline, D.S.; Hine, A.C. ; Sternberg, R.W.; Swift, D.J.P.; Wright, L.D. Sedimentation on continental margins: an integrated program for innovative studies during the 1990's. EOS 69:58-68; 1988.

Akira Okubo

Professor
Ph.D., 1963
The Johns Hopkins University

One of my major research interests is dispersion—the spread and mixing of substances—in the sea. Dispersion (or diffusion) plays an important role in pollution in marine environments, in particular, coastal environments. Those pollutants include such substances as oil, toxic chemicals, sewage and sludge, and plastics.

Since oceanic motions are inherently nonlinear and three-dimensional, they are potentially capable of generating chaotic motion. Substances embedded in the ocean flow are subject to the chaotic motion that tends to spread substances in the environment. Another interesting manifestation of chaos is the fractal nature of the motion of particles in the sea. Thus, the fractal dimension of drifters in the sea is used to characterize the complex nature of their trajectories. Oceanic motions also have an important effect on marine organisms. The transport of fish eggs and larvae are mostly passive and, hence, the oceanic currents, turbulence, and waves can contribute to larval transport and recruitment.

Timm, U.; Okubo, A. Diffusion-driven instability in a predator-prey system with time varying diffusivities. Journal of Mathematical Biology 30:307-320; 1992.

Yan, H-H.; Okubo, A; Schubel, J.R.; Pritchard, D.W. An analytical model for remote sensing determination of the mixed layer depth. Deep-Sea Research 38:267-286; 1991.

Craig, C.L.; Okubo, A. Physical constraints on the evolution of ctenophore size and shape. Evolutionary Ecology 4:115-129; 1990.

Mitchell, J.G.; Okubo, A.; Fuhrman, J.A. Gyrotaxis as a new mechanism for generating spatial heterogeneity and migration in microplankton. Limnology and Oceanography 35:123-130; 1990.

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Sanderson, B.G.; Goulding, A.; Okubo, A. The fractal dimension of relative Lagrangian motion. Tellus 42A:550-556; 1990.

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Sanderson, B.G.; Okubo, A. Diffusion by internal waves. Journal of Geophysical Research 93:3570-3582; 1988.

Hartmut Peters

Assistant Professor
Ph.D., 1981
University of Kiel, Germany

Since my Ph.D. work, I have been interested in oceanic processes of small scales, in turbulent mixing, and internal waves. I am continuing to analyze observations from the Equatorial Undercurrent of the Pacific, and I have begun work in the Hudson River.

Measurements of velocity and temperature with a spatial resolution of a centimeter allow a quantification of turbulent mixing; the vertical turbulent fluxes of momentum, heat, and nutrients can be estimated. The analysis is thus focused on the role of mixing in the flow dynamics and in the biogeochemical environment; it will also enable an improved representation of small-scale processes in numerical circulation models of tropical as well as coastal areas.

With funding from the National Science Foundation, field experiments in the Hudson estuary will begin in the spring of 1993. An acoustic Doppler current profiler is presently being integrated into a complete system of current profiling, navigation (Global Positioning System), and meteorological measurements on MSRC's R/V *ONRUST*.

The field work will encompass measurements of the basic flow, using our ADCP, as well as the small-scale turbulence, using a microstructure profiler, presently being developed. Imaging echo soundings make turbulent overturning, as well as internal wave activity, visible. This work will help to improve our understanding of the estuarine dynamics and the environmental effect of the physical conditions.

McPhaden, M.J.; Peters, H. On the diurnal cycle of internal wave variability in the equatorial Pacific Ocean: results from moored observations. Journal of Physical Oceanography 22: 1317-1329; 1992.

Peters, H.; Gregg, M.C.; Sanford, T.B. Equatorial and off-equatorial fine-scale and large-scale shear variability at 140° W. Journal of Geophysical Research 96:16,913-16, 928; 1991.

Peters, H.; Gregg, M.C.; Toole, J.M. Meridional variability of turbulence through the undercurrent. Journal of Geophysical Research 94: 18,003-18,009; 1989.

Peters, H.; Gregg, M.C.; Toole, J.M. On the parameterization of equatorial turbulence. Journal of Geophysical Research 93:1199-1218; 1988.

Sheldon Reaven

Associate Professor
Department of Technology and Society
Joint with MSRC
Ph.D., 1975
University of California at Berkeley

I have been working mostly in two areas of waste management: what to do with garbage, especially plastics, and what to do with nuclear wastes. My approach to these problems might be called "technology assessment." This means working on problems from both the scientific end (assessing expert disagreement over the relevant scientific theories, mathematical models, and methods of analysis) and from the ethical and policy end (focusing on fairness issues, competing values of interested parties, risk analysis, facility siting, and overall policy evaluation). My experience has been that all of the complex environmental problems we face today are characterized by thoroughgoing scientific and nonscientific disagreement, and I have tried to help both scientists and lay citizens untangle the web of conflicting evidence and argumentation surrounding these problems.

Current research projects include (1) a study with Drs. Vincent Breslin and R. Lawrence Swanson of the breakdown and environmental impacts of degradable plastics in landfills, seawater, and other environments; (2) a project to develop a recycling "audit service" (a walk-through, on-site list of options for reducing waste generation, increasing recycling, and using more recycled materials) for restaurants, including fast-food establishments; (3) a study of the energy impacts of recycled plastic "lumber" and construction blocks made from incinerator ash. I also work with towns and cities to develop recycling and waste management programs.

Reaven, S.J.; Tonjes, D.J. Waste avoidance in the restaurant industry. Waste Management Research Report: News from State University of New York at Buffalo and Stony Brook, and Cornell University; 3(1):15-16; 1991.

Breslin, V.T.; Swanson, R.L.; Reaven, S. Investigations of the degradability of a cornstarch-based plastic. Interim Report for Archer Daniels Midland Company, Decatur, IL; May 1990.

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Reaven, S. One person's opinion: we need a model professional recycling curriculum. Resource Recycling, September/October; pp. 36-37, 66; 1988.

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Frank J. Roethel

Lecturer
Ph.D., 1982
State University of
New York at Stony Brook

My research group and I are investigating the feasibility of utilizing combustion by-products, including ash from the combustion of garbage and trash in novel marine and terrestrial applications. The efforts of my students were realized with the first artificial reef in the coastal waters of the United States constructed from blocks of stabilized incineration ash. Since placement of this structure in Long Island Sound in 1987, a multidisciplinary approach to evaluating the environmental acceptability of this novel recycling option has evolved.

Working with faculty from other Stony Brook departments and researchers from other institutions, our research team is evaluating the physical and chemical characteristics of the residuals, as well as changes in the engineering properties and alterations in the chemical composition of the blocks. Students interested in biology and toxicology are investigating the colonization of the habitat and the potential for uptake by marine organisms of both inorganic and organic constituents associated with the residue.

Recent state and federal funding to evaluate terrestrial applications of incineration ash reuse has resulted in the construction of a boathouse on this campus. The building and surrounding environment is currently being monitored for alterations in air quality and for soil contamination. Another terrestrial application for incineration ash that is being evaluated is the construction of a highway using asphalt made with ash. Following construction of the highway, MSRC researchers, along with scientists from New York and New Jersey, will monitor the performance with an in-depth multidisciplinary investigation and will conduct an environmental assessment of this material.

van der Sloot H. A.; Woodhead, P.M.J.; Hockley, D.; Roethel, F.J. The long-term behavior of stabilized coal ash in the sea. Proceedings of American Coal Ash Association's 9th International Coal Ash Symposium, January 22-25. Orlando, FL; 1991.

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Lechich, A.F.; Roethel, F.J. Marine disposal of stabilized metal processing waste. Water Pollution Control Federation, January; 60:93-99; 1988.

J. R. Schubel

Professor, Dean and Director
Ph.D., 1968
The Johns Hopkins University

My current research is concentrated in two general areas—coastal zone management in the broadest sense and marine policy. For many years, I have been frustrated by the long lag between advances in our understanding of processes, phenomena, and problems in the coastal ocean, and the translation and incorporation of that new knowledge into management policies and practices to conserve and, when necessary, to rehabilitate important coastal environments and their living resources. In an effort to shorten this lag, we created two new initiatives in 1989; the Coastal Ocean Action Strategies (COAST) Institute and the Long Island International Forum on the Environment (LIIFE).

Each autumn, leading environmental scientists and policy makers from around the world participate in the Long Island International Forum on the Environment. We meet in Montauk at Long Island's East End to focus our attention on a single major environmental problem. Each problem selected must be global in scope and expressed with particular clarity within this region. The goals of the session are to state the problem in tractable form, to identify the full range of alternatives for dealing with it, the advantages and disadvantages of each alternative, and to incorporate the findings into an appropriate plan of action. The output of LIIFE serves as the input to the COAST Institute.

Each summer, the COAST Institute brings leading scientists together with important regional leaders to interact in an intensive one- to three-week session to produce a comprehensive short-term and long-term plan of action for the specific problem. The first problem that the COAST Institute tackled was floatable and medical-type wastes on the region's beaches, a problem which cost the Long Island economy an estimated $1 billion in the summer of 1988.

The staff of the COAST Institute was successful in working with relevant agencies to craft a comprehensive plan to deal with floatables the following summer and in the longer term. The second problem being attacked by LIIFE and the Coast Institute was eutrophication of coastal waters.

The COAST Institute also takes on other activities and has been a pioneer in an emerging field known as information engineering--structuring information into forms and strategies to attach specific problems of the coastal ocean. COAST has been called upon to assist in resolving coastal problems throughout the U.S. and in many parts of the world. There are exciting opportunities for MSRC graduate students who are interested in working at the interfaces of science policy and management to be involved in most COAST projects.

Schubel J.R. On refinement of the use of salinity as the basis for a standard to use in conjunction with flow to protect important living resources of the San Francisco estuary. Working Paper No. 96., Ref. 92-1 of the Marine Sciences Research Center, SUNY at Stony Brook, NY; 1992.

Schubel, J.R. The second phase of an assessment of alternatives to biological nutrient removal at sewage treatment plants for alleviating hypoxia in western Long Island Sound. Working Paper No. 56, Ref. 91-19 of the Marine Sciences Research Center, SUNY at Stony Brook, NY; 1991.

Schubel J.R.; Pritchard, D.W. Some possible futures of Long Island Sound. Working Paper No. 55, Ref. 91-17 of the Marine Sciences Research Center, SUNY at Stony Brook, NY; 1991.

Mary I. Scranton

Professor
Ph.D., 1977
Massachusetts Institute of Technology/
Woods Hole Oceanographic Institution

I am very interested in the factors controlling the cycling of organic compounds in sediments and in the water column. Since fatty acids and hydrogen are important intermediates in the anaerobic decomposition of inorganic macromolecules, we began by studying the processes controlling the cycling of these compounds in sediments. At present, we are carrying out a study of the controls on turnover of hydrogen, low molecular fatty acids, and methylamines in the oxic and anoxic portions of a coastal anoxic basin.

This study, which has been a collaborative effort with scientists at the University of Rhode Island, focuses on the effects of light and oxygen on rates of transformation of the relevant species. We have found major differences in the patterns of cycling of amines and fatty acids with depth, with time of day, and with oxygen concentration, which seem to be closely related to variations in biological populations. We also have preliminary evidence for sulfate reducing and methanogenic activity within the water column. Finally, we have obtained some of the earliest data for concentrations of amines and fatty acids within the water column. Future work in this area will emphasize determining the importance of water column remineralization in controlling carbon flux to the sediment, and the extent to which the remineralization is dominated by oxic versus anoxic processes.

I am also interested in studying aspects of the methane cycle in marine systems which are related to "global change" issues. Methane is an important "greenhouse gas" so it is important to understand sources and sinks of the compound in nature. Together with Marie de Angelis, my group recently carried out a study of the methane cycle in the Hudson River. We discovered that methane oxidation can effectively remove methane from freshwater, but that oxidation is suppressed (and thus methane flux to the atmosphere is enhanced) from saline waters. Studies in the Pettaquamscutt River in Rhode Island also have suggested that steady state fluxes are much lower than fluxes caused by episodic events (storms, tidal mixing) and imply that fluxes of methane and other reduced gases from marine systems may have been underestimated in the past. In addition, in the Pettaquamscutt, we have obtained evidence for diel variations in methane concentrations in a micro-oxic zone. The methane variations observed indicate (1) that methane production must be taking place in the water column within a zone where oxygen is measurable, at least during parts of the day; and (2) that methane oxidation varies with oxygen production by organisms such as those which can tolerate reducing conditions. Both observations are rather startling, and require further study.

deAngelis, M.A.; Scranton, M.I. The fate of methane in the Hudson River and estuary. Global Biogeochemical Cycles (in press).

Monetti, M.; Scranton, M.I. Fatty acid oxidation in anoxic marine sediments: the importance of hydrogen sensitive reactions. Biogeochemistry 17: 23-47; 1992.

Scranton, M.I.; McShane, K. Riverine sources of methane to the southern bight of the North Sea. Continental Shelf Research 11:37-52; 1991.

Michelson, A.R.; Jacobson, M.E.; Scranton, M.I.; Mackin, J. Modeling the distribution of acetate in anoxic estuarine sediments. Limnology and Oceanography; 34:747-757 1989.

Lawrence B. Slobodkin

Professor
Department of Ecology and Evolution
Joint with MSRC
Ph.D., 1951
Yale University

My central concern is, given the enormous complexity, variability, variety, and fragility of ecological systems, can a theory of ecology actually answer questions, or must it be a discussion of over simplified and arbitrary models, suggested by, but not representing, nature? I have approached this problem by attempting to so thoroughly describe a simple group of organisms (Hydra) that their ecological and evolutionary responses to ecological perturbations in the field may be predicted. For reasons related to their developmental constraints they are, I believe, more amenable to such a description than almost any other metazoans.

The simplicity of Hydra has permitted the development of a theoretical model in which ecological and evolutionary properties can be predicted from physiological assumptions. I plan to test these predictions in the field, using a combination of ecological and molecular biological techniques.

Focusing on simplicity in biology led me to write a book on analysis of simplicity and complexity in more general contexts.

Slobodkin, L.B. G. Evelyn Hutchinson: an appreciation. Journal of Animal Ecology (in press).

Slobodkin, L.B. Simplicity and complexity in games of the intellect. Cambridge: Harvard University Press; 279 pp; 1992.

Slobodkin, L.B.; Bossert, P. The Coelenterates. In: Thorpe, J.H.; Covich, A.P., eds. Chapter 5, Ecology and Classification of Freshwater Invertebrates. San Jose: Academic Press; 1991.

Gatto, M.; Matessi, C.; Slobodkin, L.B. A physiological approach to ecology and evolution of simple organisms. Evolutionary Ecology 3:1-30; 1989.

Slobodkin, L.B. Looking again at blooms - the null case of the paradox of the plankton. In: Cosper, E.M.; Carpenter, E.J.; Bricelj, V.M., eds. Novel phytoplankton blooms: causes and impacts of recurrent brown tides and other unusual blooms. Coastal and Estuarine Studies, Vol.35. Berlin: Springer-Verlag; pp. 341-348; 1989.

Slobodkin, L.B. Intellectual problems of applied ecology. Bioscience; 35:337-342 (reprinted in South African Institute of Ecologists Bulletin; December; 7:7-18); 1988.

Slobodkin, L.B.; Ginzburg, L. R.; Akcakaya, H.R.; Slice, D. The theory of population dynamics: II. Physiological delays. Bulletin of Mathematical Biophysics 50:503-515; 1988.

Slobodkin, L.B.; Ginzburg, L. R.; Akcakaya, H.R.; Slice, D. Balanced growth rates vs. balanced accelerations as causes of ecological equilibrium. In: Ricciardi, L.M., ed. Biomathematics and related computational problems. Kluwer Academic Publishing; pp.165-175; 1988.

R. Lawrence Swanson

Adjunct Professor
Ph.D., 1971
Oregon State University

My broad research interests concern reducing the impact of waste generation on society. In the context of the ocean, this translates to understanding and identifying the appropriate use of the ocean as part of a comprehensive waste management strategy.

I have been interested in the impact of urban population centers and their infrastructure and waste management practices on coastal waters. Sewage, storm water, and municipal solid waste all have pronounced impacts. In some cases, near-field, short-term effects of these polluting activities have been reduced with advancing technologies; but the far-field, long-term effects are not well understood. Hypoxia, floatable wastes, and cycling of contaminants are major causes of impaired economic and societal uses of coastal resources. My interests have been in using scientific understanding of these issues, within the context of societal costs, to help influence and formulate sound public policy.

The development of secondary materials–materials made from post-consumer waste into new products that have different forms and uses than the original products – is a promising and growing means of reusing waste materials. Understanding the engineering properties, environmental, and public health effects, and the economic and social barriers associated with these materials is important. It is my desire to expand the work that the WMI has been doing in this area so that we might help create cost effective, beneficial markets for society's residue.

Swanson, R.L.; West-Valle, A.S.; Decker, C.J. Recreation vs. waste disposal: the use and management of Jamaica Bay. The Long Island Historical Journal 5(1): 21-41; 1992.

Tonjes, D.J. and Swanson, R.L. Where does it all go? The size and methods of Long Island's solid waste 1986 and 1991. Special Report 103, Marine Sciences Research Center, The State University of New York at Stony Brook, 1992.

Swanson, R.L.; Bell, T.M.; Kahn, J.; Olha, J. Use impairments and ecosystem impacts of the New York Bight. Chemistry and Ecology 5:99-127; 1991.

Valle-Levinson, A.; Swanson, R.L. Wind-induced scattering of medically-related and sewage-related floatables. Marine Technology Society Journal 25(2):49-56; 1991.

Swanson, R.L.; Zimmer, R.L. Meteorological conditions leading to the 1987 and 1988 washups of floatable wastes on New York and New Jersey beaches and comparison of these conditions with the historical record. Estuarine, Coastal and Shelf Science 30:59-78; 1990.

Gordon T. Taylor

Assistant Professor
Ph.D., 1983
University of Southern California

My broad area of interest is marine microbial ecology. My research activities have been concentrated in three major areas: microbial mediation of biogeochemical processes; microbial biofouling; and trophic interactions among microorganisms (bacteria, protozoans, and algae). I am particularly interested in dynamic processes at interfaces, such as particle-water and air-water. I have also applied novel optical techniques, such as Raman scattering spectrometry, infrared spectrometry, and fiber optic probes, to problems in marine biogeochemistry.

Most recently, my research group has been examining the earliest stages in marine biofouling from a molecular and microbiological perspective. We have been investigating the ways in which surface chemistry of inert materials determines the character of the dissolved organic matter adsorbed to its surface, as well as its influence on microbial biofilm formation. We are examining the specificity with which bacteria attach to submersed surfaces. This research involves laboratory simulations, as well as field studies, and application of a variety of microbiological, biochemical, and novel spectroscopic techniques. Although the focus is applied towards engineering and material science issues, this research program has broader implications on problems in biogeochemistry, epibiosis, and environmental microbiology.

Another ongoing research interest is the decomposition and microbial ecology of organic debris as it sinks from surface to deeper waters. The flux and decomposition of this material in the ocean has important implications on nutrient regeneration, ocean productivity, transport of pollutants, and the ocean's capacity to utilize excess atmospheric CO_2. I have been studying the complex taxonomic composition of microorganisms (algae, bacteria, protozoa, and

zooplankton); their trophic interactions; and the biochemical processes associated with sinking particles to better understand the role of microorganisms in processing this material.

Taylor, G.T.; Troy, P.J.; Nullet, M.; Sharma, S.K.; Leibert, B.E.; Mower, H.F. Spectroscopic examination of protein adsorption onto titanium from seawater. Applied Spectroscopy (in press).

Taylor, G.T.; Karl, D.M. Vertical fluxes of biogenic particles and associated biota in the eastern North Pacific: implications for biogeochemical cycling and productivity. Global Biogeochemical Cycles 5:289-303; 1991.

Taylor, G.T.; Sharma, S.K.; Mohanan, K. Optimization of a flow-through sampling system for quantitative analysis of dilute aqueous solutions using combined resonance and surface-enhanced Raman spectroscopy (SERRS). Applied Spectroscopy 44:635-640; 1990.

Taylor, G.T. Variability in the vertical flux of microorganisms and biogenic material in the epipelagic zone of a North Pacific central gyre station. Deep-Sea Research 36:1287-1308; 1989.

Taylor, G.T.; Pace, M.L. Validity of eukaryote inhibitors for assessing production and grazing mortality of marine bacterioplankton. Applied Environmental Microbiology; 53:119-128; 1987.

Taylor, G.T.; Karl, D.M.; Pace, M.L. Impact of bacteria and zooflagellates on the composition of sinking particles: an *in situ* experiment. Marine Ecology Progress Series 29:141-155; 1986.

Prasad Varanasi

Professor
Ph.D., 1967
University of California, San Diego

The research in my laboratory is related to atmospheric remote sensing, global warming, and solar system exploration. Under research support from the National Aeronautics and Space Administration and the Department of Energy, we perform infrared spectroscopic measurements on molecular constituents of the terrestrial and planetary atmospheres.

One of the pivotal research problems associated with global warming, especially in connection with the water vapor feedback mechanism, is the enigmatic water vapor continuum, of which I was a co-discoverer as a Ph.D. student at the University of California, San Diego in 1966.

Our laboratory houses one of the world's finest commercial Fourier transform spectrometers, a tunable diode laser spectrometer, and several cryogenically coolable absorption cells (sample chambers) of our unique and original design.

Kratz, D.P.; Varanasi, P. A reexamination of the greenhouse effect due to CFC-11 and CFC-12. Journal of Quantitative Spectroscopy and Radiative Transfer 48:245-254; 1992.

Varanasi, P. Absorption coefficients of CFC-11 and CFC-12 needed for atmospheric remote sensing and global warming studies. Journal of Quantitative Spectroscopy and Ratiative Transfer 48:205-219; 1992.

Varanasi, P. Absorption spectra of HCFC-22 around 829 cm^{-1} at atmospheric conditions. Journal of Quantitative Spectroscopy and Ratiative Transfer 47:252-255; 1992.

Varanasi, P.; Gopalan, A.; Brannon, J.F. Jr. Infrared absorptio-coefficient data on SF6 applicable to atmospheric remote sensing. Journal of Quantitative Spectroscopy and Radiative Transfer 48:141-145; 1992.

Varanasi, P. Infrared absorption by water vapor in the atmospheric window. Society of Photooptical Instrumentation Engineering. Modeling of the Atmosphere 928:213-230; 1988.

Varanasi, P. Infrared line widths at planetary atmospheric temperatures. Journal of Quantitative Spectroscopy and Radiative Transfer 39: 13-25; 1988.

Varanasi, P.; Chudamani, S. Infrared intensities of some chlorofluorocarbons capable of perturbing the global climate. Journal of Geophysical Research 93(D2):1666-1668; 1988.

Duane E. Waliser

Assistant Professor
Ph.D., 1992
University of California, San Diego/
Scripps Institution of Oceanography

My research emphasizes observational and theoretical aspects of ocean-atmosphere coupling in the tropics. This includes large-scale aspects, such as the latitude preference of the Intertropical Convergence Zone, and small-scale interactions, such as the boundary-layer heat and moisture exchange associated with tropical deep convection.

I am presently studying the observed upper limits on tropical sea surface temperatures and the processes important in determining those limits. In conjunction with this investigation, I am developing improved evaporative and shortwave heat flux parameterizations for forced ocean and hybrid coupled ocean-atmosphere general circulation experiments. The goals of these numerical experiments are to extend our understanding of the seasonal cycle, the El Niño/Southern Oscillation (ENSO) and interdecadal variability, and provide operational predictions of ENSO.

I am also a participant in the SEQUOIA 2000 project. This multicampus, interdisciplinary project is designed to facilitate global change and climate research, addressing such topics as high-speed networking, visualization, and complementary use of models and observations from many climate related fields.

In almost all cases of my research, the use of synoptic and time-averaged satellite data is exploited where possible. My background in this area begins with the real-time acquisition of the telemetry stream and extends to the application of geophysical algorithms to multi-sensor satellite data.

Waliser, D.E.; Gautier, C. A satellite-derived climatology of the ITCZ. Journal of Climate (in press).

Waliser, D.E.; Graham, N.E. convective cloud systems and warm-pool SSTs: coupled interaction and self-regulation. Journal of Geophysical Research (in press).

Waliser, D.E.; Graham, N.E.; Gautier, C. Comparison of the highly reflective cloud and outgoing longwave data sets for use in estimating tropical deep convection. Journal of Climate 6:331-353; 1993.

VanWoert, M.L.; Whritner, R.H.; Waliser, D.E. Bromwich, D.H.; Comiso, J.C. The Antarctic Research Center: a source of multi-sensor satellite data for polar science; Transactions of the American Geophysical Union 73(6): 65; 1992.

Jury, M.R.; Waliser, D.E. Satellite microwave measurements of atmospheric water vapour and marine wind speed: case study application; South African Journal of Marine Science 9:309-316; 1990.

Dong-Ping Wang

Professor
Ph.D., 1975
University of Miami

My research focuses on modeling and analysis of physical processes in estuaries and over continental shelves and slopes. My students and I are studying internal tides in the Gibraltar Strait, in the Gulf of California, and on the Celtic Sea slope. We also are investigating the generation of mesoscale inertial variability on the continental shelf off northeast Spain. We have developed sophisticated numerical models for process-oriented studies and used extensive data bases for model verification.

In addition to coastal process studies, we are collaborating with the Applied Mathematics and Statistics Department at Stony Brook on the massively parallel computing. Our long-term goal is to take advantage of the recent development in supercomputing to solve large-scale coastal ocean problems. We also are collaborating with the Naval Undersea System Center (NUSC) to explore the feasibility of predicting the acoustic variability in the coastal ocean. We plan to interface the NUSC acoustic model with our general circulation model to study shallow water acoustics.

Wang, D.-P. The Strait of Gibraltar model: internal tide, diurnal inequality, and fortnightly modulation. Deep Sea Research (in press).

Salat, J.; Tintore, J.; Font, J.; Wang, D.-P.; Vieira, M. Near-inertial motion on the shelf-slope front off northeast Spain. Journal of Geophysical Research 97:7277-7282; 1992.

Wang, D.-P. Generation and propagation of inertial waves in the Subtropical Front. Journal of Marine Research 49:619-633; 1991.

Park, M.J.; Wang, D.P. Transient tidal vorticity over a hollow. In: Parker, B.B., eds. Tidal Hydrodynamics. New York: John Wiley; pp.419- 436; 1991.

Wang, D.P. Prediction of coastal ocean thermal variability. In: Potter, J.; Warn-Varnas, A., eds. Ocean Variability and Acoustic Propagation; Bordrecht, Holland: Kluwer Academic Pub.; pp. 251-260; 1991.

Chen, D.; Wang, D.-P. Simulating the time-variable coastal upwelling during CODE 2. Journal of Marine Research 48:335-358; 1990.

Chern, C.-S.; Wang, J.; Wang, D.-P. The exchange of Kuroshio and East China Sea shelf water. J. Geophysical Research 95:16017-16024; 1990.

Tintore, J.; Wang, D.-P.; Laviolette, P. Eddies and thermohaline intrusions on the shelf-slope front off the northeast Spanish coast. J. Geophysical Research 95:1627-1633; 1990.

Wang, D.-P. Models of mean and tidal flows in the Strait of Gibraltar. Deep-Sea Research 36:1535-1548; 1990.

Wang, D.-P.; Chen, D.; Sherwin, T.J. Coupling between mixing and advection in shallow sea fronts. Continental Shelf Research 10:123-136; 1990.

Chen, D.; Horrigan, S.G.; Wang, D.-P. The late summer vertical nutrient mixing in Long Island Sound. Journal of Marine Research 46:753-770; 1988.

Tintore, J.; Gomis, D.; Alonso, S; Wang, D.-P. A theoretical study of large sea level oscillations in the western Mediterranean. Journal of Geophysical Research 93:10797-10804; 1988.

Wang, D.-P. Transport model for water exchange between coastal inlet and the open ocean. American Fisheries Society Symposium 3:9-15; 1988.

Franklin F.Y. Wang

Professor
Department of Materials Science and Engineering, Joint with MSRC
Ph.D., 1956
University of Illinois

My research activities concern the synthesis of materials for specific applications and the study of their mechanical, chemical and electronic properties. My interests in the marine sciences concern the mechanical and chemical stabilities of artificially synthesized materials for the ocean environment. I am also interested in applying some aspects of materials processing theories and practices to the marine sciences, wherever there are valid features to be treated in common.

Peter K. Weyl

Professor
Ph.D., 1957
University of Chicago

The World Ocean, by interacting with the atmosphere, lithosphere, and biosphere, has stabilized the surface environment of our planet over several billion years. It acts as a superbly engineered stabilizer that has been able to cope with extraterrestrial impacts, global tectonics, and the changed biochemical interactions resulting from evolution. Unfortunately, we have neither the plans nor the specifications for the design. Instead, we must use the techniques of "reverse engineering" to determine if the system design can tolerate current rates of mechanized bioturbation.

Biologic stability requires adequate mixing of the waters of the World Ocean so that the deep waters remains ventilated and the illuminated surface waters are supplied with nutrients. Interactions with the lithosphere and biosphere must provide adequate buffering to stabilize the pH of seawater and limit the carbon dioxide content of the atmosphere. Near-surface mixing must be adequate to counteract the tendency of atmospheric moisture transport to increase the salinity at intermediate latitudes and freshen the water near the equator and in high latitudes.

In my research, I attempt to identify situations that could threaten stability. Using observational data and theory, I attempt to discover how excursions from viability are limited by physical, chemical, and biological processes in the sea.

Robert E. Wilson

Associate Professor
Ph.D., 1974
The Johns Hopkins University

My current research interests relate to transport processes in estuaries. They include specifically the description of time-dependent mixing processes in partially stratified estuaries, tidally induced residual currents in estuarine basins, and the interaction of buoyancy forced and tidally induced residual currents in estuaries.

I currently have projects related to the internal hydraulics in the Hudson River estuary, which involve both numerical simulations and acoustic observations of the internal density structure.

Wilson, R.E.; Vieira, M.E.C. Residual currents in the Peconic Bays estuary. In: Neilson, B, ed. Circulation Patterns in Estuaries. New York: Humana Press; pp. 87-95; 1989.

Peter M.J. Woodhead

Research Professor
B.Sc. Hon. 1 cl., 1953
Durham University, England

I have long-standing interests in fishes and fisheries in many waters. Present research concerns the communities of fishes inhabiting the estuary system of the Hudson River, New York Harbor, Long Island Sound, and the New York Bight—their composition, distribution, and changes in space and time. The local estuaries and nearshore waters, which are being studied, are often very contaminated and stressed, with pronounced effects on behavior and abundance distributions of fish and benthic invertebrate populations. The influences of natural (climate) changes on fish populations of the northeast region are also of great interest.

I study the ecology of reef systems, both natural and man-made, and have wide experience on Pacific and Atlantic reefs. I direct the multidisciplinary coal waste artificial reef program, which considers many of the chemical, physical, and biological interactions of marine ecosystems with reef construction materials. My principal interests concern the habitation of reefs by fish, crustacea, and benthos, their abundance, biomass, and productivity.

Woodhead, P.M.J. The fish community of New York Harbor, spatial and temporal distributions of major species. Conference Report, Impacts of New York Harbor Development on Aquatic Resources; 1987. New York: Hudson River Foundation; pp. 123-143; 1991.

Woodhead, P.M.J. Inventory and characterizations of habitat and fish resources, and assessment of information on toxic effects in the New York-New Jersey Harbor Estuary. Report in 6 sections to U.S. EPA, concerning Tasks 3.2, 5.1 and 5.3 of the Harbor Estuary Program; 199 pp.; 1991.

van der Sloot, H.A.; Hoede, D.; Wijkstra, J.; Bijker, J.; Wesseling, J.W.; Woodhead, P.M.J. Milieuhygienische consequenties bij de toepassing van gestabiliseerde reststofproduketn in kuntsmatige riffen en fij het opvullen van zandivinputte. Energieonderzoek Centrum Nederland, Petten ZG Netherlands; Report No. ECN-89-86; 81pp.; 1989.

Woodhead, P.M.J. The Hudson River artificial reef study program. Report in 6 sections to New York City Public Development Corporation; 391 pp.; 1989.

Woodhead, P.M.J. An analysis of data on the fish community and fishing resources of the Lower Bay of the New York Harbor. Report to New York State Executive Office; OGS/DLU; 153 pp.; 1988.

Woodhead, P.M.J.; McCafferty, S.S.; O'Hare, M.A. Assesments of the fish community of the lower Hudson-Raritan estuary complex. A report to U.S. Army Corps Engineers, NYD, including evaluations of an alternate site; 348 pp.; 1988.

Woodhead, P.M.J. Evaluation of the fish community in selection of disposal sites for dredged materials in the Lower Bay Complex of the Hudson-Raritan estuary. Seventh International Ocean Disposal Symposium, Wolfville, NS, Canada; 14 pp.; 1987.

Woodhead, P.M.J. Coal waste artificial reef program. Reef measurements over four years in the sea. MSRC Special Report No. 58 (Ref. 85-3) State University of New York at Stony Brook;107 pp.; 1986.

Woodhead, P.M.J.; McCafferty, S.S. Report on the fish community of Lower New York Harbor in relation to borrow pits. MSRC Special Report No. 80 (Ref. 87-4) State University of New York at Stony Brook; 102 pp.; 1986.

Charles F. Wurster

Associate Professor
Ph.D., 1957
Stanford University

My research has been concerned with the effects of stable chlorinated hydrocarbon pollutants on marine plankton communities. Focusing on those chemicals found regularly in the environment (polychlorinated biphenyls, DDT, DDE, and dieldrin), we have studied the effects on individual species, mixed cultures, and natural phytoplankton and zooplankton communities in an attempt to understand the impact of these chemicals on aquatic ecosystems.

The growth of some species of algae is inhibited by chlorinated hydrocarbon concentrations as low as the parts per trillion range. This sensitivity varies greatly with the species, the supply of nutrients, the temperature, light intensity, and the site of origin of the clone. Selective toxicity may alter the species composition within the community.

Currently, we are studying the development of resistance to toxic chemical pollutants by phytoplankton. We have found that phytoplankton from chronically polluted areas are more resistant to toxic pollutants than are those from unpolluted areas. Cross resistance to other toxicants sometimes develops when resistant strains are produced in the laboratory. We are currently investigating the mechanisms whereby phytoplankton become resistant to toxic pollutants.

I am also interested in various aspects of ornithology, and with the integration of scientific information into environmental public policy.

Ruben, H.J.; Cosper, E.M.; Wurster, C.F. Influence of light intensity and photo-adaptation on the toxicity of PCB to a marine diatom. Environmental Toxicology and Chemistry 9:777-784; 1990.

Cosper, E.; Wurster, C.F.; Bautista, M.F. PCB-resistant diatoms in the Hudson River estuary. Estuarine and Coastal Shelf Science 26:215-226; 1988.

Cosper, E.; Snyder, B.J.; Arnold, L.M.; Zaikowski, L.A.; Wurster, C.F. Induced resistance and altered environmental fitness in a marine diatom. Marine Environmental Research 23:207-222; 1987.

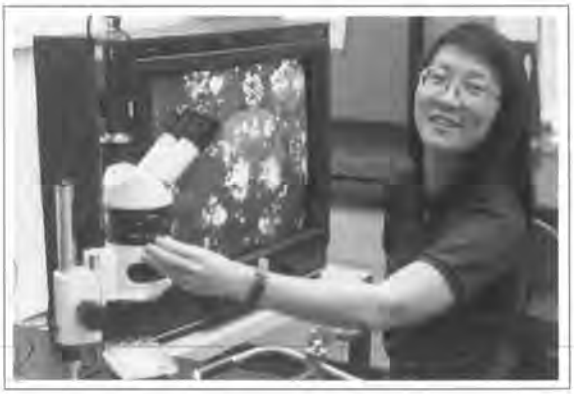
Jeannette Yen

Assistant Professor
Ph.D., 1982
University of Washington

Presently I am doing research on sensory perception by zooplankton and on the reproductive ecology of an antarctic copepod. We use state-of-the-art methodology in laser-illuminated video-imaging to visualize the microstructure of the flow field generated by copepods and other plankton. We are examining the mechanoreceptive ability of copepods to remotely detect fluid deformations produced by escaping prey, lunging predators, and attractive mates. This involves both target recognition by the predator as well as three dimensional spatial localization of hydrodynamically conspicuous signals.

To further examine sensory perception by copepods, we have developed a neurophysiological technique for recording extracellular afferent nerve impulse discharges occurring within the first antennae of copepods. We find that the antennal receptors are extremely sensitive to mechanical stimuli. A model of hydrodynamic stimulation of zooplankton will be constructed to integrate the information on copepod behavioral responses, sensory neurophysiology, and morphology, with information on their species ecology.

For the research on polar zooplankton ecology, I have spent three seasons—spring, summer and winter—on the Antarctic peninsula at Palmer Station sampling the zooplankton populations in a 1200 meter basin. We are studying the seasonal cycles in the reproductive ecology and lipid metabolism of the copepod *Euchaeta antarctica* and the interactions with their physiology, feeding ecology, and vertical migratory activity. I wish to characterize the life history traits that led to the evolution and success of this large, carnivorous marine copepod in this low temperature habitat.



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Yen, J.; Lenz, P.H.; Gassie, D.V.; Hartline, D.K. Mechanoreception in marine copepods: Electrophysiological studies on the first antennae. Journal of Plankton Research 14(4):495-512;1992.

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Yen, J.; Nicoll, N.T. Setal array on the first antennae of a carnivorous marine copepod *Euchaeta norvegica*. Journal of Crustacean Biology 10(2):327-340; 1990.

Yen, J. Predation by *Euchaeta norvegica* Boeck on eggs and larvae of the North Atlantic cod *Gadus morhua* L. Journal of Experimental Marine Biology and Ecology 112:283-296; 1987.

Yen, J. Selective predation by the carnivorous marine copepod *Euchaeta elongata*: laboratory measurements of predation rates verified by field observations of temporal/spatial feeding patterns. Limnology and Oceanography 30:577-595; 1985.

Minghua Zhang

Assistant Professor
Ph.D., 1987
Institute of Atmospheric Physics
Academia Sinica

My research interest is in the area of numerical modeling of climate and climate change. The Earth's climate system is composed of the atmosphere, the hydrosphere, the biosphere, and the lithosphere. Complicated interactions exist among these components and between various physical and dynamic processes inside them.

To quantitatively study why the Earth's climate changed in the past and how it will change in the future, for example, in response to the increasing concentration of carbon dioxide in the atmosphere, we incorporate these components and the important processes, such as atmospheric circulation, radiation, precipitation, and ocean currents, in numerical models based on physical principles or empirically obtained relationships. I use these climate models to study the interactive feedback in the climate system, to validate the current model treatments of physical processes against satellite and other observations, and to improve the model description of these processes.

I am also interested in the study of the dynamics of large-scale atmospheric waves. We study the excitation, propagation, and dissipation of atmospheric waves and their influences on the variability of atmospheric circulation. A better knowledge of the behavior of these waves will improve our understanding of the weather and short-term climate variations.

Cess, R.D.; Potter, G.L.; Zhang, M.H.; et.al. Interpretation of snow-climate feedback as produced by 17 general circulation models. Science 253:888-892; 1991.

Zeng, Q.C.; Liang, X.Z.; Zhang, M.H. Seasonal abrupt changes of the general circulation of atmosphere and their numerical simulations. Scientia Atmospherica Sinica, Special Issue, pp.22-42; 1988.

Zhang, M.H. Dynamic effect of Tibet Plateau on the rainy season atmospheric circulation in East Asia and its numerical simulation. Journal of Nanjing Institute of Meteorology 10:253-267; 1987.

Zhang, M.H. Computation and analysis of the atmospheric spectra from the linearized barotropic geostrophic model. Proceedings of International Conference on Fluid Mechanics, Beijing University Press; pp. 1-5; 1987.

Zhu, Q.G., Zhou, J.; Zhang, M.H. Characteristics of sea-land breeze in the coastal areas of Southern China. Proceedings of Tropical Atmospheric Circulation and Systems; Ocean Press; pp. 168-178; 1982.

Course Offerings

The following is a list of courses offered during the current academic year. Many additional courses are available to be offered, and the list changes from year to year. Courses may also be developed as a response to student interest.

Benthic Ecology
Biological Oceanography
Chemical Oceanography
Coastal Geology Seminar
Continental Margins
Dynamics
Early Diagenesis of Sediments
Emerging Technology in Solid Waste Management
Environmental Engineering
Environmental Law
Environmental Toxicology
Fishery Biology and Management
Geochemical Modeling
Geochemistry Seminar
Geological Oceanography
History of Waste Management
Mathematics for Marine Scientists
Larval Ecology
Long Island's Environment
Marine Geophysics
Marine Microbial Ecology
Marine Pollution
Marine Sedimentology
Oceanographic Problem Solving
Oceanography: The World Ocean
Organic Geochemistry
Physical Oceanography
Physiological Ecology of Marine Organisms
Primary Productivity in the Sea
Special Topics
Special Topics in Biological Oceanography
Special Topics in Chemical Oceanography
Special Topics in Geological Oceanography
Special Topics in Marine Management
Special Topics in Physical Oceanography
Teaching Practicum
Time Series
Turbulence in coastal and Ocean Waters
Waste Management Issues
Zooplankton Ecology

Adjunct Faculty

Randall Alberte, University of California at Los Angeles, Department of Biology. Primary production, environmental regulation of plant and algal adaptation.

Harold Berger, Professor, part time. Region I Director (Retired), New York Department of Environmental Conservation. Solid waste disposal; groundwater quantity and quality; air emissions; wetland formation and protection.

William Crawford, Institute of Ocean Sciences, Canada. Continental shelf and slope dynamics microstructure; tidal dynamics.

David Duffy, the Lyme Disease Research Project, Seatuck Foundation. Interaction of commercial fisheries and marine predators; Lyme disease; conservation strategies.

William Eichbaum, The Conservation Foundation/World Wildlife Fund. Coastal zone policy and management; environmental conservation.

Paul Falkowski, Brookhaven National Laboratory. Marine phytoplankton ecology; phytoplankton physiology.

Gene Feldman, National Aeronautics and Space Administration, Goddard Space Flight Center. Remote sensing of phytoplankton; satellite oceanography.

Charles Flagg, Brookhaven National Laboratory. Continental shelf dynamics, acoustical oceanography.

Martin Garrell, Department of Physics, Adelphi University. Physical processes and properties relative to marine environmental problems.

Sarah Horrigan, National Association of State Universities and Land Grant Colleges. Marine policy; plankton ecology.

Garry Mayer, National Oceanic and Atmospheric Administration. Estuarine processes; marine environmental restoration.

Larry Noonan, Office of the Provost, University at Stony Brook. Management policy; budgeting and fiscal analyses.

Joel O'Connor, U. S. Environmental Protection Agency. Environmental assessment, policy, and quality indicators; marine ecology.

Claudio Pescatore, Brookhaven National Laboratory. Hydrogeology and groundwater transport of contaminants; mathematical modeling; radiochemistry.

Scott Siddall, Kenyon College, Ohio. Benthic ecology; aquaculture; animal-flow interactions; computer applications to ecological problems.

Sharon Smith, Brookhaven National Laboratory. Plankton ecology; nutrient regeneration by zooplankton.

Dennis Suszkowski, Hudson River Foundation. Estuarine sedimentology; ocean and estuarine policy and management.

Richard Thomson, Institute of Ocean Sciences, Canada. Coastal oceanography; continental shelf waves; slope currents.

James Vaughn, Brookhaven National Laboratory. Transport fate and effects of viruses in the aquatic environment.

Mário Vieira, U.S. Naval Academy, Oceanography Department, Annapolis. Circulation and the dynamics of coastal and estuarine waters.

Douglas Wallace, Brookhaven National Laboratory. Chemical oceanography; use of freons as oceanic tracers.

Professors Emeriti

H. H. Carter
J. L. McHugh
Donald W. Pritchard

Other Non-teaching Faculty

Aidan Hampson, Postdoctoral Research Associate
Christina Barnes Heilbrun, Postdoctoral Research Associate
Magali Gerino, Postdoctoral Research Associate
Eric Schultz, Postdoctoral Fellow
Uhyon Shin, Postdoctoral Research Associate

Staff

Diane Achman, Research Support Specialist
Janice Barone, Secretary
Trudy Bell, Editorial Associate
George Carroll, Manager, Computing Facilities
Carol Case, Secretary
Joanne Cosgrove, Secretary
Amir Ehtisham, Research Support Specialist
Maureen Flynn, Secretary
Gina Gartin, Secretary
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Henry Harrison, Electronics Technician
David Hirschberg, Senior Research Scientist
Clifford Jones, Facilities Manager
Roger Kelly, Assistant Librarian
David Lucyk, Ocean Instrument Technician
Lori Palmer, Director of Graphic Arts
Laura Richardson, Graduate Program Coordinator
Susan Rudnick, Project Staff Associate
Jeri Schoof, Executive Assistant to the Dean and Director
Aileen Schwartz, Secretary
Hiram Szeto, Research Support Specialist
Helen Ulreich, Secretary
Barbara Vallely, Staff Assistant
Maryanne Wente, Research Support Specialist
Mark Wiggins, Field Specialist
Thomas Wilson, Ocean Instruments Engineer
William Wise, Associate Director; Director, Living Marine Resources Institute
Bernice Wornow, Staff Assistant
Bret Zielenski, Acting Research Vessel Captain and Small Boats Captain

1991-1992 Ph.D. Recipients and Thesis Titles

Decker, Cynthia J. The relationship between field distributions and feeding behavior in a marine harpacticoid copepod, *Pseudobradya* sp.

Dlhopolsky, Rose. A study of ERBS shortwave measurements and bidirectional reflectance models for the clear sky ocean surface.

Juanes, Francis. The advantages of advection: recruitment, piscivory, growth and consumption of young-of-the-year bluefish *Pomatomus saltatrix*.

Kazumi, Junko. Aldicarb transformations and bacterial activities in oxic and anoxic aquifer and salt marsh sediments.

Kim, Yongha. The Jovian ionosphere.

Kim, Yongseung. Sulfate impact upon low-level cloud albedo over oceans.

Rude, Peter D. On the marine geochemistry of fluorine.

Siddiqui, Pirzada. Cytological and immunochemical studies on the marine planktonic cyanobacterium *Trichodesmium*.

Subasilar, Bedrettin. The broad band overlap problem in atmospheric trace gases.

Sun, Ming-yi. Early diagenesis of chloropigments in coastal sediments.

Zhou, Meng. Tide and gravity current interaction in estuaries.

1991-1992 M.S. Recipients and Thesis Titles

Boekhoudt, Byron G. The effect of current shifts on larval fish distributions around Barbados.

Cenni, Serena. Periodicity of growth line formation in larvae and postlarvae of hard clams (*Mercenaria mercenaria*).

Eshet, Yuval. An assessment of fishery management processes and practices in Long Island Sound by New York.

Fields, David M. Outer limits and inner structure: the 3-dimensional flow-field of *Pleuromamma xiphias*.

Gupta, Sanjay. The construction of a biophysical model to study plankton dynamics in an estuary.

Hince, Eric C. Evaluation of mineral indices as indicators of littoral transport direction along the south shore of Long Island.

Li, Boen. Study on degradation of plastics.

Mau, Jenq-Chi. Internal tidal current over the continental slope off Taiwan.

McShane, Kathleen. Bioassay studies of seawater leachates derived from incineration residues.

Merkle, Peter B. A dynamic fugacity simulation model of the atmospheric deposition of semivolatile organic compounds to aquatic environments.

Milligan, Allen J. Factors affecting the occurrence and persistence of the "Brown Tide."

Pantoja, Silvio C. Measurement of cell-surface enzymatic oxidation of amino acids and amines in seawater using synthetic fluorescent compounds.

Rotunno, Teresa. Spatial and temporal spawning patterns of *Peprilus* spp. (Butterfish) in the Mid-Atlantic Bight.

Schubert, Christopher E. Observations of infragravity wave motion in a tidal inlet.

Seplow, M. Stacey. The influence of groundwater seepage on the pore water salinity in Great South Bay.

Shi, Yan. Effect of air-sea gas exchange and vertical mixing on dissolved oxygen in the shelf edge exchange processes experiment II.

Sobel, Jack A. Population genetics of the queen conch, *Stromousgigas* in Belize, Central America.

Strieb, Max D. The effects of prey size, prey density and eelgrass habitat characteristics on predation of post-settlement bay scallops, *Argopecten irradians.*

Weissman, Penny D. The effect of peritrich ciliates on the production of *Acartia* in Long Island Sound.

Wente, Maryann. Mobility of dioxins and furans from stabilized incineration residue in seawater.

Yang, Xiaohua. Concentrations and biological uptake of three methylamines in marine,estuarine and lacustrine waters.

Zhang, Yingyi. Two studies on the sources and reactions of tropospheric gases.

Zimmer, Robert M. Sand supply to coastal dunes: Long Island, New York.

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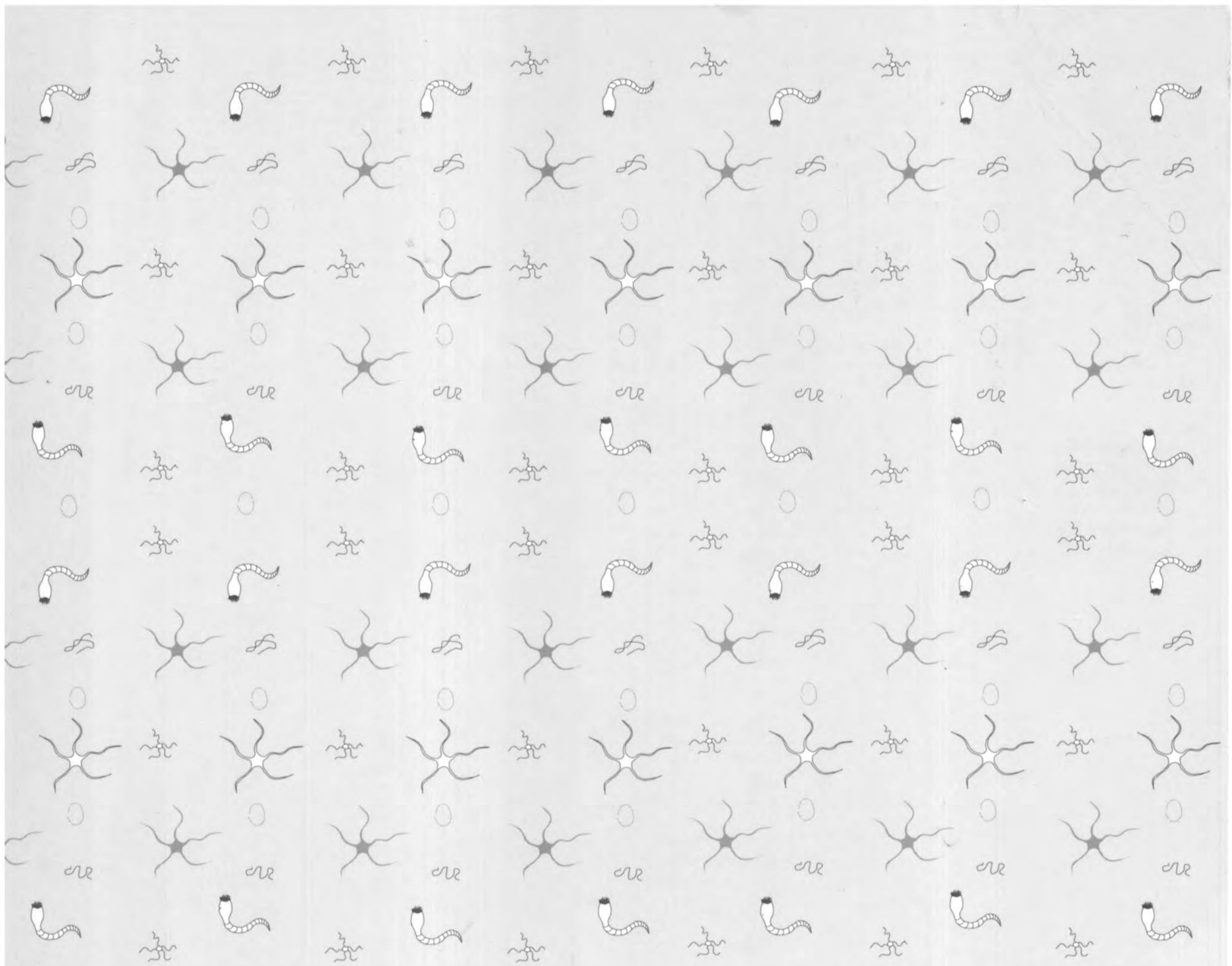


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