



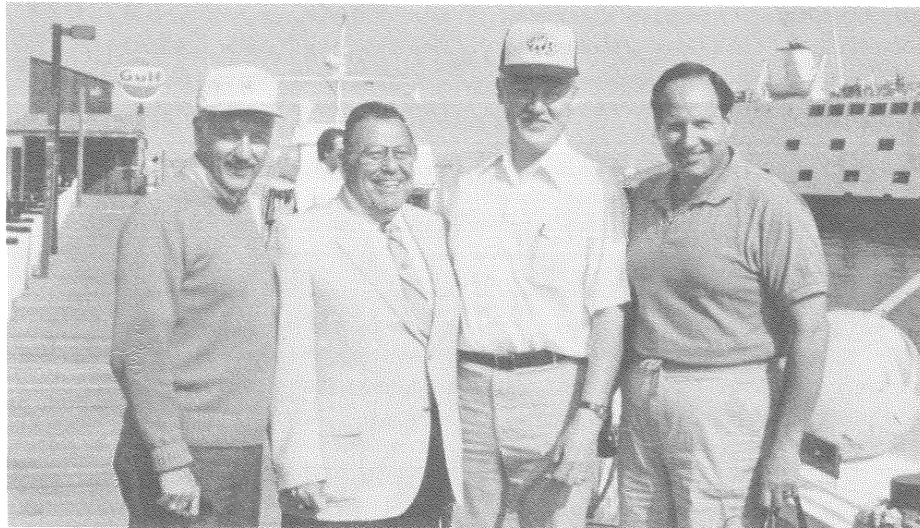
msrc

STONY BROOK

STATE UNIVERSITY OF NEW YORK

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New York State Senators (from L.) LaValle, Trunzo, Johnson, and Lack get ready to join 17 other legislators and staff for the MSRC legislative cruise aboard the R/V ONRUST and the LORD JIM.



LEGISLATORS AND MSRC SCIENTISTS CRUISE LONG ISLAND SOUND

M SRC hosted 25 New York State senators, assemblymen, and staff members aboard the Center's R/V ONRUST and an accompanying vessel, LORD JIM, in September for the annual Long Island Sound cruise for legislators. The legislators, becoming scientists for a day, assisted MSRC staff and faculty in collecting and analyzing water and bottom samples taken from the Sound.

The cruise gives the legislators a first-hand look at the region's coastal marine problems and fosters discussion between scientists and law makers to explore problem-solving strategies, including the role of legislation, to conserve this environment. During the cruise, MSRC faculty discussed and demonstrated research related to key marine environmental issues in the region. Some of these issues are the Long Island Sound Study, brown tide, and the emerging garbage problem. 🌿

NEW LONG ISLAND INTERNATIONAL FORUM FOR THE ENVIRONMENT (LIIFE)

First Session on Sewage Treatment

T he first three-day LIIFE meeting was held this past autumn in Montauk, where 21 participants from around the U.S. wrestled with what criteria should be used to determine the appropriate level of treatment for sewage treatment plants discharging into coastal marine waters.

While there have been some improvements in the quality of the nation's coastal marine waters over the past decade, the group concluded that the present legislative and regulatory framework underpinning marine wastewater programs and facilities do not serve the nation well. The group urged the U.S. Congress to modify the Clean Water Act—the legislation that presently requires treatment plants to upgrade to secondary—to allow flexibility to fully assess all treatment technologies, including new and innovative ones.

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n e w s l e t t e r

The Long Island International Forum for the Environment was created in 1989 in collaboration with the Montauk Lake Club to gather leading environmental scientists and policy makers from around the world once each year to explore a major environmental problem and all possible alternatives for dealing with it. Participants then formulate an appropriate plan of action.

This session's members concluded that the appropriate level of treatment must be in keeping with the specific ecosystem and environmental setting, which includes land use patterns and practices throughout the watersheds. The group recommended that far greater emphasis be placed on reducing the volume of waste water through conservation and keeping contaminants and floatables out of the waste stream through source control. In New York City, Boston, and a number of other cities, primarily on the East Coast, abatement of combined sewage overflow might be more effective in cleaning up coastal waters than implementation of secondary treatment.

In the closing paragraphs of the conference statement, the participants wrote, "Present policies and practices concerning sewage treatment plants that discharge into the coastal marine waters of the United States can result in large monetary expenditures that are of questionable value to the environment and to society." The concluding statement was, "It's time for a change." 🌿

RETIREMENT BANQUET FOR PROFESSOR EMERITUS DONALD W. PRITCHARD

MSRC colleagues gathered at the Port Jefferson Country Club in October to honor Professor Emeritus Donald W. Pritchard for the many contributions he has made to the development of the Center. Professor Pritchard, internationally recognized as a fundamental contributor to the understanding of the physics of estuaries and nearshore waters, came to MSRC in 1977. He earned distinction as a scientist who applied research results to solve problems resulting from society's uses and misuses of the coastal ocean.

Pritchard served as a Professor and Associate Director for Research at MSRC for more than a decade, and during his final year, was the acting dean and director. Prior to joining MSRC, he was founding director of the Johns Hopkins University's Chesapeake Bay Institute and served in that capacity for nearly a quarter of a century. Under his directorship, the institute was widely considered to be one of the outstanding coastal research institutions in the world. 🌿

NEW FACULTY MEMBERS

Vincent Breslin, Ph.D. 1986, Florida Institute of Technology.

Dr. Breslin first worked at MSRC as a postdoctoral fellow with Dr. Frank Roethel's group on use of incineration ash blocks to construct artificial reefs. In 1988 he was appointed Senior Research Scientist with the Waste Management Institute and then Assistant Research

Professor in 1989. Breslin has continued to work on uses of construction products from incineration ash and has begun a new project testing rates and products of degradation of biodegradable plastics in various (landfill, compost, beach) environments.

Bruce Brownawell, Ph.D., 1986, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution.

Dr. Brownawell joined MSRC in 1989 as an Assistant Professor with the Waste Management Institute. He is interested in the biogeochemical processes affecting the transport and fate of organic compounds in coastal, estuarine, and groundwater environments, particularly the aquatic chemistry of hydrophobic pollutant compounds.

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

Dr. Fisher became a member of the MSRC faculty in 1988, joining as Associate Professor with the Waste Management Institute. His research is focused on the interactions of marine organisms with toxic chemicals, particularly with select metals and long-lived radionuclides emanating from the nuclear fuel cycle. Fisher's biogeochemical studies explore the bioaccumulation and trophic transfer of the chemicals, their impacts on the organisms, and the roles that the organisms play in mediating the cycling and vertical transport of the chemicals in the ocean.



Participants in the first annual Long Island International Forum for the Environment (LIIFE) take a break outside the Montauk Lake Club and Marina, a cosponsor of the activity.



DARCY LONSDALE
Ecology and Evolution of
Copepods: Measurements
of Adaptation.

Why do populations of the same species living in different environments or different species living in similar environments exhibit different strategies for living? Since her days as a graduate student, Assistant Professor Darcy Lonsdale has been interested in such questions about life history trait variation, particularly, among geographically separate populations of an estuarine copepod, *Scottolana candensis*.

In the laboratory, *Scottolana* that Lonsdale collected from Maine and Maryland grow faster and produce more eggs than those collected from Florida, even at the higher test temperature of 25° C. Since these differences are found when copepods are reared exactly alike, they are likely due to genetic variation and not to environmental factors. These results have led to several related questions that Lonsdale would also like to answer. What are the differences between the environments — for example temperature, food availability, or predators—that brought about these genetically based trait differences in this species? Do these different strategies result in more offspring that survive to reproduce, relative to other strategies? Evolutionary theory has historically held that since there is a large energy cost to animals to reproduce, different strategies of reproduction have evolved in different environments to yield the most offspring that survive to adults.

Lonsdale believes that differences in environmental temperature are not sufficient to explain the observed variations in her laboratory reared *Scottolana*. Why do the more “cold-adapted” populations have faster growth rates and produce more eggs, particularly at higher temperatures, compared to the “warm-adapted” populations? According to her, the differences are more likely a response to multiple forces, perhaps including food availability.

Recently, she found that *Scottolana* collected from Maine produce larger nauplii (copepod juvenile stage) that grow more slowly, compared to those from Maryland, when reared in the laboratory under high food conditions. Under low food conditions, however, the Maryland nauplii suffer significantly higher mortality than the Maine nauplii. The survivorship differences were found even at the higher test temperature. Other researchers have reported that phytoplankton, the major food of copepods, is in higher concentrations in Maryland waters than in Maine waters. This evidence supports Lonsdale’s hypothesis that food availability is an important selective force directing the life history variation found in *Scottolana*.

As a first step to resolve her findings, she plans to investigate whether copepod growth and reproduction in the field is limited by food. This work will be done in collaboration with Dr. Susan Bell, an ecologist at the University of South Florida.

Many estuaries are undergoing substantial physical and biological

changes from human activity, for example, changes in the rate of freshwater discharge and other sources of pollution. Thus, besides holding interest from an evolutionary viewpoint, Lonsdale’s research on natural variation of populations may be useful to understand the ecological impact of coastal activities.

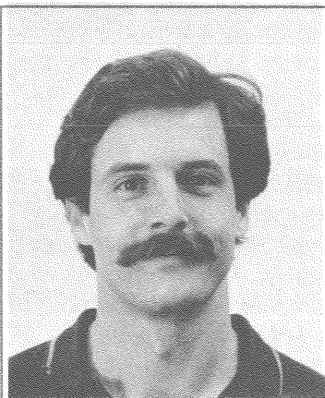
Another collaborative research project with MSRC’s Dr. Elizabeth Cosper has some practical applications, which may contribute answers to long-sought questions important to Long Island’s bays. She and Cosper want to know what the overall rate of carbon transfer is between phytoplankton, the primary producers that make atmospheric carbon available to other marine organisms, and zooplankton, the grazers on the phytoplankton. They will investigate if zooplankton grazing selectivity contributes to the succession of plankton species and monospecific algal blooms, such as the “brown tide,” an unusual algal bloom that infested Long Island bays for three recent summers.

Lonsdale joined MSRC in 1987 after a postdoctoral fellowship with Dr. Jeffrey Levinton and a research faculty position in Stony Brook’s Department of Ecology and Evolution. She is enthusiastic about her future at MSRC—continuing her work on *Scottolana*, studying the larger picture of ecosystem-oriented questions about coastal systems, and the prospects of collaborating with other MSRC researchers on questions of mutual interest. 🌿

Conditions	Nauplii Populations From	
	Maine	Maryland
IN NATURE:*	Lower food biomass available	Higher food biomass available
IN LABORATORY:		
High food conditions**	Produce larger nauplii Take longer to hatch Slower growth Similar mortality	Produce smaller nauplii Take less time to hatch Faster growth Similar mortality
Low food conditions	Lower mortality	Higher mortality

*Data obtained by other researchers.

**High food concentrations simulate concentrations of phytoplankton during blooms.



ROBERT COWEN

Larval Bluefish Navigate to Nurseries

Assistant Professor Robert Cowen became intrigued with questions about larval fish recruitment while doing graduate research in California on fish ecology and various life history features in the California sheephead. While comparing these features among populations along the West Coast, he noticed very distinct year-to-year fluctuations in recruitment to different areas—one area receiving recruitment regularly, while another receiving recruitment perhaps every 10 years.

Many questions begged to be answered about these observations: How does recruitment vary from year to year and from place to place? What causes this variability? What effect did the variability have on the different populations? To answer these questions, Cowen necessarily switched his research focus from ecology to fisheries oceanography. And with his switch to the East Coast to join MSRC, he began concentrating on the long-distance transport and recruitment of bluefish larvae.

Bluefish are one of the favorite catches of sportfishermen all along the Atlantic seaboard. Besides supporting a large part of the recreational fishing industry, bluefish are also a significant, albeit much smaller, part of the commercial fisheries in the region. But bluefish abundance periodically rises and then falls as a result of as yet unknown environmental factors. If scientists could identify what causes fluctuations in abundance, they might be able to aid fishery managers in

predicting future abundance and the effect of harvest reductions on long-term abundance.

Bluefish spawn twice a year: once in the summer in the New York Bight region and once in the spring in the south Atlantic region off the Carolinas, just inshore of the northward flowing Gulf Stream. In this area, the currents have a slight northward component, but veer off to the east in the mid-Atlantic region. Earlier work by MSRC's David Conover and his students has verified that the bluefish that are spawned in spring in the South Atlantic Bight recruit into the estuaries of the New York Bight. Since the bluefish larvae do not move northward in the Gulf Stream, *how* they manage to travel north from the South Atlantic Bight is one of the many questions about bluefish recruitment that Cowen and Conover are trying to resolve.

Currently, Cowen and his students are asking how much the transport of the larval bluefish (*Pomatomus saltatrix*) depends on the currents and at what stage, if at all, do the fish become independent of the currents and able to moderate their effects by behavior. If the juveniles were just flowing with the current, they would end up southwest of the New York Bight and not in the estuaries of Long Island.

"The dogma about larval fish transport has been that these fish act primarily as passive particles," Cowen said "But pelagic juvenile bluefish are strong swimmers, and indications are that they may be capable of moving independently of the currents." He believes that one important aspect of this is not just their ability to swim perpendicular to the currents, but rather to swim directionally — to navigate.


Once up here, the larvae aggregate off the slope front near the outer edge of the continental shelf, and Cowen is trying to determine how they move into the estuaries, apparently doing so *against* the prevailing currents, which move east to west on the shelf and in a more southwesterly direction on the slope. Cowen is also beginning a collaboration with MSRC's physical oceanographer Malcolm Bowman on another major project involving dispersal of pelagic larval reef fish around the island of

Barbados. Reef fish ecologists have traditionally believed that there is some offshore eddy that moves the larvae off the reef and out to sea. The hypothetical explanation for how the fish get back to the reef is that the fish, when ready to metamorphose and return to the reef, somehow get out of that eddy by swimming or that the eddy flings them back to the reef.

"This hypothesis has never been tested, yet it has important implications to understanding the separation (or lack of separation) of fish stocks in such island groups as in the Caribbean Sea," Cowen said. The researchers will be determining if each island basically reseeds itself (each island receives back its own larvae) or if larvae from a group of islands mix together in the plankton before settling back on the reefs.

The results of their research may direct local fisheries management strategies. In the case in which each island reseeds itself, each island's fisheries could be managed independently. If larvae from many islands are mixed together, management plans would have to involve groups of islands. In the Caribbean this could easily involve a variety of nations.

Besides the accomplishments Cowen has obviously made on recruitment research, he also feels a large sense of accomplishment, along with his fisheries biology colleagues, in helping to form a strong fishery biology program at MSRC. The fisheries biology group now has several students each year graduating with an emphasis in fish biology.

Cowen created the course Biology of Fish and put together a fish collection for the course. He has also developed a field course, Introduction to Tropical Marine Ecology, which he teaches in Puerto Rico during the January intersession. For his efforts, Cowen has just received the Merit Award for Teaching and Curriculum Development, sponsored by the Office of the Provost. 

Roger Flood, Ph.D., 1978, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution.

Dr. Flood came to MSRC from Lamont-Doherty Geological Observatory as Associate Professor in 1988. His research interests include marine geology, sediment dynamics, and continental margin sedimentation. He has currently focused on processes in active sedimentary environments (deep sea, continental margins, large lakes, and estuaries) and on the study of bedforms in cohesive sediment.

Darcy Lonsdale, Ph.D., 1979, University of Maryland.

Dr. Lonsdale has been Assistant Professor with MSRC since 1987. Before her appointment, she held a postdoctoral position with Dr. Jeffrey Levinton of Ecology and Evolution. Her research centers on zooplankton ecology and life history traits, with special interest in physiology. Lonsdale's research is featured in this volume's "Focus on Research."

Hartmut Peters, Ph.D., 1981, University of Kiel, West Germany.

From 1981 until 1984, Dr. Peters was appointed Research Assistant Professor and then Assistant Professor at the University of Kiel. In 1984 he joined the University of Washington in Seattle as a postdoctoral fellow until joining the physical oceanography faculty of MSRC in 1989 as Assistant Professor. Peters' research focuses on turbulent mixing and other small-scale processes such as internal waves. His particular interests are the interaction of small-scale mixing with larger-scale circulation and the effect of the turbulent transport of momentum, heat, and nutrients.

James Rine, Ph.D. 1980, University of Miami.

Dr. Rine became Associate Research Professor on the MSRC geological oceanography faculty in 1989. His research interests involve the correlation of sedimentary deposits with depositional processes within nearshore and continental shelf areas. Rine's goal is to better understand the origins of ancient rocks by comparing them with modern sediments and environments. Thus, he examines both modern and ancient shallow marine and delta deposits, with particular emphasis on muddy coastlines.


Jeannette Yen, Ph.D., 1982, University of Washington in Seattle.

Dr. Yen held a research position at the University of Hawaii after receiving her Ph.D., and in 1989, became Assistant Professor in biological oceanography at MSRC. She has spent three seasons (spring, summer, and winter) on the Antarctic peninsula at Palmer Station studying the lipid metabolism, reproductive ecology, and feeding ecology of the copepod *Euchaeta antarctica*. Using a combination of laser optics and state-of-the-art video technology, Yen also studies sensory perception, specifically mechanoreceptive recognition of prey and predator organisms by several copepod species.

AWARDS and HONORS

Dr. Robert Cowen and Dr. Valrie Gerard were selected as recipients of the Merit Award for Teaching and Curriculum Development, sponsored by the Office of the Provost.

Dr. Edward Carpenter has been selected as chief editor of the journal "Biological Oceanography."

Dr. Monica Bricelj was awarded a travel grant to attend the Fourth International Conference on Toxic Marine Phytoplankton in Lund, Sweden, June 26-30. 

ALUMNI NOTES

Many of the nearly 300 MSRC graduates are members of the MSRC Alumni Association. The association publishes a periodic alumni newsletter and directory, and grants two awards to students (the Student Research Award and the Student Travel Award) and one to faculty and staff (the Distinguished Faculty/Staff Award).

Graduate student Michiyo Shima, who works with Dr. Robert Cowen, received the Student Research Award for the best student proposal in fall of 1988. Shima's proposal is titled, "Distribution and Onshore Transport of Spring-spawned Larval and Juvenile Bluefish in the Mid-Atlantic Bight." The proposals of Zaul Garcia-Esquivel, David Pohle, and Irma Lagomarsino received honorable mention.

The Student Travel Award was given to Alejandro Cabello-Pasini to attend a course given in the summer of 1989 in California.

The Distinguished Faculty/Staff Award was presented to geological oceanographer Dr. Charles Nittrouer in 1989 and to Facilities Manager Cliff Jones in 1988.



IN REMEMBRANCE

Bud Brinkhuis

MSRC was saddened by the untimely death of Assistant Professor Boudewijn (Bud) Brinkhuis this past July. Dr. Brinkhuis came to MSRC in 1976 and played an important role in developing programs in physiological ecology and the culture of seaweeds and other marine plants. He also played an important role in culturing relations with universities in Chile, People's Republic of China, and Mexico, where several generations of his students are carrying on this work. In the fall edition of Sea Grant's "Nor'easter," an article written about seaweed mariculture includes a discussion of Brinkhuis' research.

Blair Kinsman

MSRC was also saddened to learn in November of the death of retired Professor Blair Kinsman. Professor Kinsman was a member of MSRC's physical oceanography faculty from 1977 to 1980. While at MSRC he had a major role in the design and development of the doctoral program in Coastal Oceanography. He was a gifted teacher whose specialty was wind waves. He was the author of the classic work on waves, "WIND WAVES: Their Generation and Propagation on the Ocean Surface."

CONFERENCES and CRUISES

Dr. Monica Bricelj presented a paper on paralytic shellfish poisoning (caused by red tide dinoflagellates) in bivalves at the Fourth International Conference on Toxic Phytoplankton, held in June in Lund, Sweden. The paper was coauthored by Jihyun Lee, Allan Cembella, and Don Anderson.

Dr. Elizabeth Cosper also attended the conference in Lund, Sweden, where she gave the plenary lecture titled, "Novel Brown Tide Blooms in Long Island Embayments: A Search for the Causes," coauthored by MSRC professors Cindy Lee and Edward Carpenter.

In August, Dr. Cosper gave a talk at the 13th International Seaweed Symposium Mini-symposium on Chrysophytes in Vancouver, Canada in August. Her talk, "Recurrent Brown Tides in Long Island Embayments: Why Such Novel Blooms?" was coauthored by Cindy Lee, Edward Carpenter and postdoctoral fellow Jeng Chang.

Dr. Akira Okubo gave an overview of a paper at an Office of Naval Research workshop on small-scale bio-physical coupling, held at the Monterey Bay Aquarium in Monterey, California from August 30 to September 1. The paper titled, "Zooplankton Feeding Currents and Energy Dissipation Rate: Interaction with Turbulence," is based on a paper

coauthored by MSRC professor Jeannette Yen, Brian Sanderson, and Rudi Strickler.

Professor Edward Carpenter, Adjunct Associate Professor Douglas Capone, and postdoctoral fellows Jeng Chang and Tracy Villareal took part in an NSF-sponsored cruise on the R/V Columbus Iselin to study the physiology, biochemistry and ecology of nitrogen fixation in the cyanobacterium *Trichodesmium* in tropical seas. The cruise left from Miami on September 12, headed toward the Dominican Republic, dodged hurricanes Hugo and Iris, and returned to port on October 1. The researchers discovered a pronounced daily cycle of nitrogenase synthesis and the cycle's role in limiting nitrogen fixation.

Dr. Dong-Ping Wang attended the Almofront (Almeria-Oran front in the western Mediterranean Sea) workshop in Paris June 26-28, where he presented a talk on upper ocean frontal dynamics. Wang also visited Taiwan in July and participated in the KEEP (Kuroshio Edge Exchange Process) study.

Dr. Mary Scranton went on sabbatic leave in spring of 1989 at the School of Environmental Sciences, University of East Anglia, Norwich England. During this time, she gave two seminars in England and one in Germany, and participated in a United Kingdom program to study the North Sea during March and April. Her role in this program was to study methane production and consumption.

Dr. Sarah Horrigan spent two months this past summer at the Norrby Laboratory of the University of Umea in Sweden to coauthor with Dr. Ake Hagstrom a chapter about nitrogen cycling for the book, "Critical Processes in the Baltic Sea." As part of an ongoing collaborative project to study the response of marine bacteria growing in continuous seawater culture with added nutrients, she researched the response to added nutrients of bacteria taken from below the euphotic zone in the stratified Gulf of Bothnia. The results indicate that when the bacteria are starved, they use thymidine for nutrition rather than incorporating it into DNA for growth. When nutrients are added, they stop using thymidine for nutrition.

This past spring Dr. Kirk Cochran and Assistant Research Oceanographer David Hirschberg participated in Legs 2 and 3 of the North Atlantic Bloom Experiment (NABE) to observe development of the spring bloom in the North Atlantic. NABE is part of the NSF-sponsored Global Ocean Flux Study (GOFS), which is aimed at researching carbon cycling in the ocean.

Cochran and Hirschberg's part of the study focuses on particle cycling in the surface and deep ocean using naturally occurring isotopes of thorium. Graduate student Sigrun Jonasdottir also participated in Leg 2, studying zooplankton production and its relation to phytoplankton biomass and biochemistry.



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