



Vol. 4 No. 3 Summer 1993

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Vincent Breslin (R) and Simons Fellow Andrew Notarian look for signs of biodegradability among various types of film strips kept in seawater.

School Students Spend Study Summers at MSRC

Every summer, students from around the country and the world begin appearing in the laboratories of MSRC. This summer, four MRAP (Minorities Research Apprenticeship Program) students, one Simons Fellow, two Ward Melville Fellows, and several others are fulfilling their



dreams to participate in a bonafide research project with MSRC faculty and staff.

Simons Fellow conducts plastics research for WMI and Westinghouse competition

Andrew Notarian from Northport High School, has been working on a project with Waste Management Institute's Vincent Breslin as part of his Simons Fellowship and intended entry in the Westinghouse science competition. Notarian is testing the rates of breakdown of several biodegradable polymer films. These are the second generation of degradable polymers being tested by Breslin in natural environments such as buried in soil, in seawater, and in the beach strawline at Flax Pond.

The first generation of polymers, which are long chains of smaller molecules linked together, were composed of starch in a matrix of polyethylene and were not

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MSRC aboard the Forbes Highlander

As part of the MSRC's 25th year-long anniversary celebration, Forbes Magazine will be running a special supplement on the Center. The supplement, which will discuss

sustainable development and the coastal environment, is slated for publication in October.

To announce the pending publication and introduce Center personnel to their clients who are keenly interested in the environment, Forbes held an evening cruise and dinner aboard their 125-foot yacht, the *Highlander*. As the ship sailed around a clear, moonlit Manhattan, several MSRC faculty and staff were on hand to answer the questions of invited legislators, CEOs, and other Forbes' clients about the harbor, the Center, and its role in solving regional environmental problems.

MSRC director, Jerry Schubel, (R) discussing the work of the Center with guests aboard the Forbes Highlander.



plume exchange processes on the distributions of nutrients, oxygen, and organic matter on the planktonic food web," with Lwiza and Dr. Sam Wainright of Rutgers.

Ed Carpenter completed a month-long research cruise begun in June on the Baltic Sea to study the biology of cyanobacteria and dinoflagellate blooms. He gave a seminar at the University of Constance (Germany) in June on the biology of cyanobacteria, in particular, *Trichodesmium*.

Robert Cowen, and **Steven Morgan** organized and hosted the first Biennial Larval Ecology Meeting August 20-23 in Port Jefferson (Long Island), New York. Cowen, Morgan, postdoctoral fellow **Eric Schultz**, and graduate students **Susan Sponaugle** and **Jonathan Hare** presented papers at this meeting, which was sponsored by MSRC's Living Marine Resources Institute and New York Sea Grant Institute.

Cowen also presented a paper at the American Society of Ichthyologists and Herpetologists and the Early Life History Conference of the American Fisheries Society, held concurrently at the University of Texas in Austin. Also attending and presenting papers were postdoctoral fellow **Eric Schultz** and graduate students **Leonardo Castro**, **Rob Cho**, **Jonathan Hare**, **Susan Sponaugle**, and **Rob Johnston**.

Cowen's student **Jonathan Hare** received a Hudson River Foundation graduate fellowship.

Jane Fox presented "The escape of O and H from Mars," at the May meeting of the American Geophysical Union in Baltimore. In June, she gave an invited talk, "Photochemistry on Venus and Mars, or, What we have learned from planetary atmospheres that enhances our understanding of the terrestrial atmosphere?" for the Eighth Annual Meeting of CEDAR (Coupling Energetics and Dynamics of Atmospheric Regions) in Boulder Colorado. She also presented "The nightward fluxes of O⁺ in the Venus ionosphere" (J. L. Fox and J. F. Brannon) at the 7th Scientific Assembly of International Association of Geomagnetism and Aeronomy in Buenos Aires, Argentina in August.

Fox has recently been awarded a three-year grant from the Venus Data Analysis Program (NASA) to study the nightside ionospheres of Venus and Mars.

Cindy Lee was Distinguished Lecturer at the Chesapeake Biological Laboratory in Solomons, Maryland in April. In May, she chaired the Strategic Planning Meeting for the Oceanography Division of the National Science Foundation (NSF) and also chaired the meeting of the NSF Advisory Committee on Ocean Sciences in Washington, D.C.

In June, Lee lectured in a European Community course on the "Analysis of marine particles," at the University of Bergen (Norway) and in July received the Norwegian Marshall Fund Award to visit Tronso, Norway in August 1994.

Gordon Taylor attended an Office of Naval Research workshop on Marine Environmental Quality in July, held at the Airlie Foundation, Airlie, Virginia.

Taylor has received three new grants: "The role of bacteria and microalgae in unexplained juvenile oyster mortalities" (with **Monica Bricelj**) from Northeastern Regional Aquaculture Center; "Effects of episodic disturbances on microbial degradation of polycyclic aromatic hydrocarbons (PAHs) in coastal sediments," (with **Bruce Brownawell** and **Glenn Lopez**) from the Office of Naval Research; and "Pelagic microbiological processes and hypoxia in western Long Island Sound" from New York City Department of Environmental Protection and New York Sea Grant.

Minghua Zhang attended a joint meeting of Department of Energy (DOE) AMIP/FANGIO in Bologna, Italy in May; the Fourth Workshop on the Community Climate Model in Boulder Colorado in June; and the DOE ARM/CHAMMP Workshop in Fort Collins, Colorado early September.

In Bologna, Italy, he presented the following talks: "Approaches to compare clear-sky radiative fluxes between GCMs and ERBE: Methods III and IV; and "An approach for understanding climate feedback processes in atmospheric general circulation models.

In June at the NCAR meeting, he gave the talk, "Climate sensitivities from three atmospheric general circulation models.

Marine Sciences
Research Center



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The Formation of Sub-sea Sedimentary Rocks

Geological oceanographer Chuck Nittrouer's research objective is to provide the tools to understand the oceanic and environmental conditions millions of years ago that formed the sedimentary rocks geologists now find above sea level. To do this, he must look at how similar rocks are forming below sea level.

"I try to understand how the ocean creates signals, the diagnostic characteristics, within the strata to help other geologists interpret sedimentary rocks," said Nittrouer. "This way they can understand the history of the Earth better, because most of its history is recorded in these rocks."

Products of land erosion—sand, silt, and clay—head for the ocean in runoff, primarily through rivers, and end up on the ocean's continental margins. This extends from the coastal plains, which can stretch inland tens of miles and out to the continental rise at depths of about 4,000 meters. Here, more than 90% of the Earth's sedimentary rocks are formed when the layered sediments, or strata, are later compacted under the weight of new sediment.

Nittrouer and his students look at how biological, chemical, and physical processes impart certain sedimentary characteristics and how groups of particles are layered together in the preserved strata. The researchers examine isolated or combined characteristics in a range of settings—where the waves and tides are strong and where they are weak. They then try to isolate one factor, for example, the strength of the current, and measure this in a range of different settings—polar, temperate, and tropical.

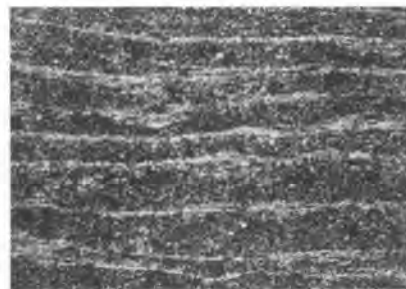
Nittrouer's team uses a unique approach, combining standard techniques that other geologists use (seismic profiling; measurements of waves, tides, and currents; mineralogical studies; and sedimentary structure and grain size) with a range of short- to long-lived radioisotope techniques that permit an evaluation of the time these layers were deposited. "If you can't evaluate time, then you are not doing the geological investigation in the best way," said Nittrouer.

Using this combination of techniques, they can look at a packet—a series of depositional events—and tell which marine physical processes are responsible for the various coarse- and fine-grained, thin and thick layerings, and when they occurred. They can tell, for example, what events happened over a period of 10-20,000 years; those that occurred in decades, years, or on seasonal time scales, such as peak flood and low stages of rivers; fortnightly tidal cycles; and even those that took seconds to happen, such as the period of a wave.

The Amazon is a good place to study rocks formed under natural conditions because it is one of the few large rivers still in a relatively natural condition. The resolution of layers is also very good at the mouth of the Amazon. Nittrouer is seeing a yearly sediment accumulation of many centimeters there, compared with less than a millimeter elsewhere, a result of the large sediment supply from the river.

Besides the Amazon, Nittrouer has been working around the world to contrast different sediment systems in different places. Since 1982 he has worked in the Antarctic, where sediments are a combination of both glacial and marine input, with 40% of the marine input being diatom shells. And he just received NSF funding for a sub-polar project off the southern

In the coastal area near the Amazon, the sediment has a soft, "yogurt-like" consistency. Because of this characteristic, the waves behave differently from those on a typical sandy shore, and are called "solitary" waves. Each wave puts down a thin layer of sediment, microns thick (light bands), which Nittrouer and graduate student Mead Allison have recorded and measured using a range of techniques. In this type of wave, the energy goes into one crest, and each crest is separated by about 20 seconds (dark bands).



Alaskan coast, where sediments are released in icebergs from glaciers that come down fjords to the sea, as well as from rivers. He also hopes to contrast Amazon sedimentation with that in a different equatorial setting—New Guinea.

Besides understanding sedimentation processes from their analyses, Nittrouer and his students can see when major environmental changes have occurred. For example, over the past few thousand years, the Amazon continental shelf shows two drastic shifts, moving from environmental conditions where it was rapidly accumulating sediment to one where it was eroding sediment over most of the shelf, to once again where it is accumulating.

"This demonstrates that nature on its own went through some fairly dramatic fluctuations, which had nothing to do with humans stripping the rain forest," said Nittrouer. "We are concerned about what humans are going to do to the environment, but in fact, nature can do even more drastic things to itself. If we can understand better how the system naturally responded in these dramatic situations, we could better predict what humans can do to the environment."

Summer students
(continued from page 2)



▲
Flax Pond lab manager, Jim Brister, with phytoplankton cultures from his experiment to test efficiencies of various growth media.

paper or give a presentation on their research results at a public conference or seminar.

Levine, who is in the environmental science program with a focus on aquatic biology at Brown, worked with marine biologist Glenn Lopez, studying feeding rates of the polychaete (a marine worm) *Clymenella torquata*.

Gardella is a senior in biology and interested in marine ecology. She spent her summer working with David Conover on a project to establish how efficiently (catch per unit effort) young-of-the-year bluefish in the Hudson River catch their prey and what species they are eating. They are particularly interested in what impact the bluefish ultimately have on population size of other important commercial species, such as striped bass. ■

MSRC Welcomes

Jim Brister on joining MSRC this past May as the new manager of the Flax Pond Laboratory. Jim came to the Center with broad experience in mariculture, but specializing in feeding rates and food conversion efficiencies. He last worked as a manager of a private shrimp and redfish aquaculture company in Galveston, Texas. Projects on his agenda for MSRC include culturing food for shellfish projects slated for the coming year, coordinating and supervising graduate student research at the lab, and public educational activities, such as tours of the facilities and activities relating to coastal and marsh ecology.

MSRC Congratulates

Bret Zielenski on his recent appointment to replace Chris Stuebe (who retired this past year) as captain of the R/V ONRUST. Zielenski had been first mate and relief captain since 1986, and served as interim captain since Stuebe's retirement and during the search to fill this position.

On the agenda for coming months

A Revival

Seacoast Sunday Breakfast Series

Beginning in October and bringing four new topics and panelists to the table for discussion. This semester, it's the *Brunch* table, not Breakfast, starting at 11 am and ending at 1pm.

CALENDAR

October 10 -

Wetlands and Their Management

October 31 -

Natural History of Long Island

November 7 -

Environmental Law/Shoreline Processes

November 21 -

Environmental Journalism

2nd Annual Open House

Saturday, October 23rd from 11am to 4 pm at MSRC. Even bigger and better than last year's. Look for announcements in your local newspapers for special attractions, prizes, and drawings.

Writers Festival

October 16-17 - with

- *science and nature writers
- *poets
- *journalists
- *photographers (juried contest)

Seafood feast and field trip to Long Island's Pine Barrens.

Call (516) 632-8676 for information and details.