



V. Abolins

Dr. Okubo being congratulated by (left to right) MSRC Associate Director for Research D. W. Pritchard, Provost Homer A. Neal and (far right) MSRC Director J. R. Schubel.

OKUBO WINS OCEANOGRAPHIC MEDAL

This spring Professor Akira Okubo was awarded the prestigious medal of the Oceanographic Society of Japan. In making the award, Dr. Toshio Nanniti, President of the Society, said that Professor Okubo was being honored for his "important contributions to our understanding of oceanic diffusion processes."

The medal is not awarded at fixed intervals. It is awarded when the Society feels it is necessary to honor an oceanographer for outstanding contributions to the field.

Dr. Okubo was unable to attend the presentation ceremony held in Tokyo on 8 April 1983, but sent an acceptance message along with a paper entitled "The Study of Oceanic Turbulent Diffusion" to mark the occasion. In his acceptance message, Professor Okubo thanked the Society for the great honor and acknowledged the large number of people who had encouraged and supported him over the years in his research on oceanic diffusion. Professor Okubo singled out Dr. D.W. Pritchard, Professor of Oceanography and Associate Director of Research at MSRC for special recognition of his guidance, support and understanding over many years.

In addition to the Medal, which symbolizes excellence in the field of oceanography, Dr. Okubo received a monetary award which he donated to the Stony Brook Foundation.

Professor Okubo joined Stony Brook's Marine Sciences Research Center in 1974. Previously he had held positions at the University of Washington, and for many years was on the staff of the Johns Hopkins University's Chesapeake Bay Institute. He went to the Johns Hopkins in 1958 to study with Professor D.W. Pritchard, then Director of the Chesapeake Bay Institute. Professor Okubo received his Ph.D. degree in oceanography from the Johns Hopkins University in 1963.

Professor Okubo is an expert in diffusion of all kinds. Most of his earlier work dealt with theoretical studies of the physics of oceanic diffusion, but in recent years he has turned his attention to diffusion processes that affect the dispersal of animals ranging in size from insects to whales. In 1980 he published an important book on diffusion processes entitled "Diffusion and Ecological Problems: Mathematical Models." He is the author of more than 100 scientific papers. Professor Okubo spent the spring semester on sabbatical at Cornell University as Visiting Professor of Applied Mathematics and Ecology.

MSRC STUDENTS WIN NATIONAL AWARDS

Ms. V. Monica Bricelj, a Ph.D. candidate at the MSRC, has won the prestigious 1983 T.C. Nelson Award for the best student paper presented at the National Shellfisheries Association (NSA) Convention. The paper that she presented at the seventy-fifth annual convention, held in Hilton Head, South Carolina, was titled, "Effects of Suspended Sediments on the Feeding Physiology of the Hard Clam, *Mercenaria mercenaria*." Ms. Bricelj was awarded an honorary five-year membership in the Association.

Her paper was selected by a committee appointed by the NSA's Executive Board. Ms. Bricelj's research is supported by the New York Sea Grant Institute and the National Science Foundation through a Grant for the Improvement of a Doctoral Dissertation. Her advisor is Associate Professor Dr. Robert Malouf.

Ms. Bricelj came to the MSRC in 1977 from Buenos Aires, Argentina, and received her Master's Degree in December 1979. Her Master's Thesis titled, "Fecundity and Related Aspects of Hard Clam *Mercenaria mercenaria* Reproduction in Great South Bay, N.Y. 1979," received the Steinberg-Squires Award for the best graduate thesis that year.

Ms. Bricelj's recent work has major implications for Long Island's shellfish industry. Recent studies have shown that suspended sediments can profoundly affect the food availability and growth of estuarine commercial shellfish. An understanding of these effects, resulting from both laboratory and field studies, is important in any attempt to predict the effect of changes in natural particulates of hard clam populations.

Ms. Mary C. Gibbons, a Ph.D. candidate at the MSRC, was also honored for her presentation at the NSA convention. She was awarded honorable mention for her paper titled, "Predation of Juvenile Hard Clams *Mercenaria mercenaria* by Fifteen Invertebrate Species with Special Reference to Crabs." Predators, especially crabs, are one of the more serious threats to juvenile hard clam survival. Ms. Gibbons is presently on the staff of the Virginia Institute of Marine Science.

NEW PROGRAMS FOR OUTSTANDING SCHOLARS

During the 1982-83 academic year the MSRC launched two exciting new programs to stimulate and extend the range of the Center's scholarly activities: the Coastal Marine Scholar Program and the Distinguished Visiting Scholar Program. The first, the Coastal Marine Scholar Program, is designed to attract to the MSRC each year two of the most outstanding young marine scientists who have recently completed their Ph.D.'s. Coastal Marine Scholars are provided full support for two academic years and are free to pursue their own research and scholarly interests. The first two Coastal Marine Scholars are Dr. Sarah Horrigan who received her Ph.D. from Scripps Institution of Oceanography in 1982 and Dr. James Eckman who received his Ph.D. from the University of Washington in 1982.

The Distinguished Visiting Scholar Program is designed to bring to the Center a small number of well established scientists who are acknowledged widely as international leaders in their fields. The scholars may be from any discipline, from any institution, from anywhere in the world. The one characteristic they must share is a distinguished record of accomplishment. Seven Distinguished Visiting Scholars were

appointed for the spring term. Each spent one to two full weeks at the Center during which he/she presented several seminars and a public lecture and was available for consultation with students, faculty, and staff throughout the day.

The participants from last spring and their home institutions are listed below.

Dr. Sallie W. Chisholm, Associate Professor, M.I.T.
Dr. Ron Heath, Associate Director, New Zealand Oceanographic Institute
Dr. Farooq Azam, Professor, Scripps Institution of Oceanography
Dr. Peter J. LeB. Williams, Professor, Southampton University (U.K.)
Dr. Joel Goldman, Senior Scientist, Woods Hole Oceanographic Institution
Dr. Paul LeBlond, Professor, University of British Columbia
Dr. Ken Mann, Professor, Dalhousie University

PEOPLE AND MEETINGS

Professor HENRY BOKUNIEWICZ, E. ANDERSON, C. SPERBER and A. WARDELL presented a paper entitled, "Coastal Erosion of Glacial Outwash" at the Northeast Sectional Meeting of the Geological Society of America held at Kiamesha Lake, 23-25 March 1983. Two of the authors--E. Anderson and A. Wardell--were the MSRC's first Undergraduate Summer Fellows (1982) and the paper was based in part on their research.

Professor BOKUNIEWICZ presented an invited paper, "Behavior of Sand Caps on Subaqueous Dredged Sediment Disposal Sites" at the 4th International Ocean Disposal Symposium held in Plymouth, England 11-15 April 1983.

MYRNA JACOBSON and MARY MYERS presented a poster at the East Coast Benthic Meetings held at the Florida Institute of Technology in Melbourne, Florida 25-27 March 1983. The poster presented was titled, "Life History and Community Associates of *Asabellicles oculata*, a Tube-Dwelling, Mound-Building Polychaete."

MSRC was well represented at the 46th Annual Meeting of the American Society of Limnology and Oceanography (ASLO) held in St. John's Newfoundland, 13-16 June 1983.

Professor E.J. CARPENTER and SUSAN DUNHAM presented a paper, "Uptake of Nitrogenous Nutrients by Phytoplankton in the Carmans River Estuary, Long Island, New York." S. DUNHAM and E.J. CARPENTER presented, "Nitrogen Fixation and Denitrification in Sediments of the Carmans River Estuary, Great South Bay, NY." Both papers are a

result of on-going research in the Carmans River Estuary.

Dr. SARAH HERRIGAN presented a paper at ASLO with A.F. Carlucci and P.M. Williams of Scripps Institution of Oceanography entitled, "Primary Productivity in Sea Surface Films."

LISA CAMPBELL and E.J. CARPENTER presented a poster at the ASLO meeting titled, "Identification of Marine *Synechococcus* Strains by Immunofluorescence."

JIM BAUER and Professor D.G. CAPONE presented a poster titled, "Bacterial Growth and Polynuclear Aromatic Hydrocarbon Mineralization Potential in Shallow Marine Sediment Systems."

Professor Capone and M. BAUTISTA presented a poster titled, "Groundwater May be a Source of Nitrate in Nearshore Sediments of Great South Bay, N.Y."

RON KIENE and D.G. Capone presented a poster titled, "The Effects of Organic Pollutants on Sediment Methanogenesis and Sulfate Reduction."

Also attending the ASLO meeting, held at Memorial University of Newfoundland were MSRC Professor LINDA DUGUAY and Danny Carpenter (E.J. Carpenter's son).

On 24 June 1983 Professor McHUGH was invited to give the principal address at the dedication of the Shellfish Laboratory of Rutgers University, Dr. Harold H. Haskin, Director. This is a fine new laboratory, the principal work of which is to study the effects of MSX *Haplosporidium nelsoni* on oysters in Delaware Bay, and to investigate the surf clam resource off New Jersey and south, especially the recovery of the resource from the low oxygen kill in 1976.

COASTAL FACETS AS INDICATORS OF SHORELINE RESPONSE TO RISING SEA LEVEL — M.S. ZIMMERMAN

The dynamic processes affecting the beach and nearshore zone have been the target of increased concern as shoreline erosion in the past century has increased dramatically. Several factors have been advanced explaining this dominance in shoreline recession. Included among them are climatic variations, a lack of sands supplying the modern shorelines, sea level rise due to the melting of the glacial ice caps, and man's activities in overdevelopment of the coastal zone.

The predicted response of the coastal zone to both long and short-term changes has become increasingly important as man has encroached on the coastal system for both economic and recreational pursuits. The prediction of shoreline changes becomes invaluable in that great natural and

monetary losses are incurred when the shore erodes. The severe erosion experienced at Westhampton Beach and Fire Island, New York this past winter are clear examples of the erosion problems existing along segments of Long Island's south shore. The processes at work on the shoreline must be understood in order to implement erosion control measures and to aid coastal zone managers in any future coastal zone planning. To date, no predictive tool has yet been developed that can adequately explain the changes seen along the Long Island shore.

The most dramatic shore losses are brought about during storms. The individual effects of storms are superimposed on seasonal cycles in the beach. In turn, these seasonal variations are superimposed on a long-term, gradual erosion of the shore due to rising sea level. Aerial photography and beach profiling methods may document short-term changes, but do not provide information about long-term systematic patterns of erosion. Theoretical approaches must then be used to predict the response of the shore to the rise in sea level over long time scales. The goal of this research was to develop a conceptual model to describe the mode of the shore's response to rising sea level through an examination of the coast's cross-sectional geometry.

The most widely used method to describe shoreline response to rising sea level is known as Bruun's Rule. Simply stated, Bruun's Rule states that in the face of rising sea level the beach will erode, and the material eroded from the beach will be deposited offshore in such a way that the cross-sectional profile of the coast will remain constant. The water depth immediately offshore of the beach remains the same because sediments from the beach are deposited there to keep pace with the rising water levels. The closure depth, or the depth past which sediment is not moved by normal waves, moves landward along an imaginary slope which can be predicted by knowing the closure depth, the distance from shore of the closure depth, and the location of the most landward part of the beach that is affected by the waves.

Analysis of both bathymetric and topo-graphic cross-sections at East Hampton, NY, drawn from 30m above mean sea level to 30m below sea level showed that the coastal profile could be described by three facets. The first facet was above sea level. This was the gently seaward sloping sandy plain that had been deposited at the margin of an immense glacier during the last ice age, 20,000 years ago. This plain terminated at the more steeply sloping beach surface which ran offshore to a water depth of about 10m. In turn, the beach surface graded into an offshore ramp which was parallel to the glacial outwash plain, but

vertically displaced from it by 13.5m. The depth below which normal waves had no effect on mobilizing bottom sediments was found to be between 20 to 34m. To maintain this faceted geometry in the face of rising sea level, it was found that the closure depth could not migrate landward in the manner that was required by Bruun's Rule. Rather, the closure depth had to move along an imaginary line the slope of which was equal to the slope of the outwash plain. Offshore sediment deposition was not required to maintain the cross-sectional profile shape, and the sediment eroded from the shore could then be moved along shore supplying the littoral drift.

In response to a yearly rise in sea level of 3mm/yr, it was estimated that the 40m study area would supply 387,700 m³ of sediment annually. However, this term was corrected for sorting in that only a percentage of the grains mined from the outwash plain were suitable for use as beach sands. This correction was estimated to be 45%. Thus, the annual predicted loss of sand from the study area was 193,690 m³. This value was comparable to the measured net transport here and, because offshore deposition was not required, was hypothesized to be a major source of the longshore drift along Long Island's south shore. The model predicted an average landward shore migration of 1.01 m/yr which was reasonable and consistent with historical observations.

This mode of shoreline response appeared to dominate along the south shore of Long Island and may be a contributing factor in describing shoreline response to rising sea level on other glaciated coasts around the world.

Ms. M. Zimmerman conducted this study as part of her research for the M.S. degree. Her advisor was Prof. Henry Bokuniewicz. This study was funded by East Hampton Beach Preservation Society and New York Sea Grant Institute.



M.S. Zimmerman

Houses undercut by severe erosive damage, Westhampton Beach, May 1983.

PUBLICATIONS

BOWMAN, M.J. Review of "Introduction to tides: the tides of New England and New York" by A.C. Redfield. In: EOS 64 (115).

CAPONE, D.G. 1982. Nitrogen fixation (acetylene reduction) by rhizosphere sediments of the eelgrass *Zostera marina*. Marine Ecology, Progress Series 10(1):67-75.

PETERSON, W.T., R.D. BRODEUR and W.G. PEARCY. 1982. Food habits of juvenile salmon in the Oregon Coastal Zone, June 1979. Fisheries Bulletin 80(4):841-851.

NORTHEAST ALGAL SYMPOSIUM

The 22nd Northeast Algal Symposium was convened by Dr. B.H. Brinkhuis of MSRC and Dr. Peter Heywood of Brown University on 7 and 8 May 1983 at Woods Hole, Massachusetts. The program included 31 contributed papers, 24 posters, and 4 invited papers on topics ranging from freshwater phytoplankton to marine algae and seagrasses. Awards were given for the "Best Student Paper" and "Best Student Poster." Dr. Brinkhuis convened a special symposium on "Seaweed/Algal Mariculture."

There were a total of 176 registered participants. Next year, the society that has met informally for 22 years in various locations in the northeast will become the first official section of the Phycological Society of America. The Society has a goal of providing an opportunity for student presentations and about half of the presentations are by students. Contributions by MSRC and Brown University were used to offset the printing of a high quality program and abstracts booklet.



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