

CAREERS IN OCEANOGRAPHY

THE OCEANOGRAPHY SOCIETY (TOS) is pleased to announce its publication of a volume entitled *Careers in Oceanography—A Special Edition with Emphasis on Opportunities for Disabled Persons*. The booklet was made possible through a grant from the Department of the Navy and a contract issued by the Office of Naval Research.

The intended audience is young people considering careers in oceanography, but counselors will also find it to be an important reference. The text explains what oceanography is, what oceanographers do, how to train for careers in the field, and where the jobs are now and will be in the future. It concludes with an extensive reference section listing agencies and organizations involved with oceanography, marine research and educational institutions, organizations for the disabled, and additional sources for information on the field, educational curricula and financial aid.

While there are special comments and sections devoted to those with disabilities, the booklet provides valuable and comprehensive information for all who are exploring career options in oceanography and marine-related fields. The Oceanography Society hopes *Careers in Oceanography* will increase interest in the field among young people and open the door to satisfying careers for many new oceanographers.

To obtain a copy contact TOS headquarters (address on p. 2). □

COMMITTEE ON THE COASTAL OCEAN

THE COMMITTEE on the Coastal Ocean (CoCO) is a standing committee of the Ocean Studies Board established in late 1989 to provide scientific leadership in coastal ocean research, advance scientific understanding of the coastal ocean and foster the application of this knowledge to the conservation of the coastal environment and wise uses of its resources. CoCO is composed of fifteen members representing a broad range of coastal science and policy disciplines and is chaired by Dennis Powers and Donald Boesch (See the table below for list of CoCO members).

For the purpose of committee activities, the coastal ocean is defined as extending from the deep ocean across the continental margins to the shore and into estuaries as far as the penetration of sea salt. The Committee may also consider issues related to the resources of the Exclusive Economic Zone, which generally extends beyond the continental margins.

The long-term goal of CoCO is to improve the scientific understanding of the coastal ocean and its policy implications in research, management and policy in the coastal United States

and on the global scale. This will entail insuring adequate resources for research, organizing research to foster rapid advance in understanding, and applying new and existing knowledge.

The initial goals of CoCO are to:

- Provide a continuing forum for exchange of ideas and information among federal agencies and the scientific community with respect to federal scientific programs in the coastal ocean;
- Identify important fundamental research questions that are not being adequately addressed by existing programs;
- Identify which of the many complex problems related to societal concerns about the coastal ocean can be resolved or solved by new or expanded scientific research and monitoring efforts;
- Collaborate with the agencies to develop or coordinate these scientific efforts;
- Develop a framework for a coherent, national coastal ocean science program.

Implicit in these goals is the recognition that many coastal ocean problems arise in a local or state context; however, CoCO will concentrate its initial focus on the federal level. It is also recognized that many coastal environmental and resource problems cross

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COMMITTEE ON THE COASTAL OCEAN (CoCO)

Name	Institution	Discipline
Dennis Powers (<i>Co-chair</i>)	Stanford University	Marine Biology
Donald Boesch (<i>Co-chair</i>)	University of Maryland	Biological Oceanography
David Aubrey	Woods Hole Oceanographic Institution	Marine Geology
Robert Beardsley	Woods Hole Oceanographic Institution	Physical Oceanography
Biliana Cicin-Sain	University of Delaware	Marine Policy
John Costlow	Duke University	Marine Ecology
John Farrington	Woods Hole Oceanographic Institution	Marine Geochemistry
Eileen Hofmann	Old Dominion University	Physical/Biological Interactions
Robert Howarth	Cornell University	Terrestrial/Aquatic Interactions
George Knauer	University of Southern Mississippi	Biological Oceanography
Scott Nixon	University of Rhode Island	Marine Ecology
James Overland	National Oceanic and Atmospheric Administration/Pacific Marine Environmental Laboratory	Coastal Meteorology
Thomas Powell	University of California	Physical Oceanography
Jerry Schubel	State University of New York	Marine Geology
Michael Sissenwine	NOAA/National Marine Fisheries Service	Fisheries

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national borders, or are common to many coastal countries. While CoCO will attempt to foster international scientific cooperation related to these issues, particularly as they relate to multinational research initiatives, the Committee's initial focus will be primarily on improving the progress and coherence of U.S. coastal ocean science.

In order to avoid getting bogged down in the great nexus of scientific and policy issues, the committee will initially:

- Focus on identifying important areas of both fundamental and applied research that are not receiving adequate attention by federal agencies; and
- Select a few important, pervasive and tractable issues (problems) of the coastal ocean that might benefit from a fresh, new assessment using available data and information. These assessments may (a) clarify the adequacy of existing data and information to prescribe management strategies to deal effectively with these problems, and (b) provide guidance in designing new research initiatives or in modifying existing ones.

To facilitate these efforts, subject-oriented Task Groups have been formed to review and determine the appropriate relationships among major federal research programs and initiatives in the following areas:

- Coastal habitat/living resources,
- Land-ocean flux,
- Physical processes,
- Monitoring,
- Information transfer/policy implications.

Groups are to collect relevant descriptive material, review programs and initiatives, prepare brief summaries (with common format to be developed) of these agency programs, and propose further analytical or organizational activities which may be appropriate to the committee.

Within each issue area, the Committee will seek to:

- Learn about existing national coastal research efforts and perspectives;
- Identify the key scientific problems;
- Review existing state of knowledge and identify critical research needs;
- Outline research programs to address these needs;
- Communicate results of these assessments to research community and the government.

For further information about the National Research Council's Committee on the Coastal Ocean, please contact: Ocean Studies Board, HA-550; National Research Council; 2101 Constitution Ave., NW; Washington, D.C. 20418; (202) 334-2714; Telemail: M.KATSOUROS/OMNET. □

CoOP HOLDS INITIAL MEETING

By the CoOP Interim Steering Committee

CoOP (Coastal Ocean Processes) is an organization dedicated to promoting and organizing interdisciplinary oceanographic and meteorological research over the continental margins. During a January meeting of the interim steering committee, the following general goal statement was adopted:

To obtain a new level of quantitative understanding of the transports, transformations and fates of biogeochemically important matter over the continental margin.

As a research program, CoOP is not constrained by any agency's programmatic or geographical constraints. At present, CoOP is taking on the responsibility of helping to define an initial, pilot-level interdisciplinary program which would be sponsored by the National Science Foundation (NSF), starting in fiscal year 1992. CoOP is envisioned to last for at least ten years and to put forward a number of interdisciplinary projects during its duration. Thus, the relatively modest level of research envisioned at present is only a start. As a means to define the sort of initial research that could be done, a meeting was held at the University of California, San Diego, on July 9-11, 1990. Attendance was about fifty invited scientists, representing meteorology, and biological, chemical, geological and physical oceanography. The size of the workshop was chosen as a compromise between being representative of the community and keeping things to a manageable, interactive size.

After some initial talks, the heart of the meeting consisted of a series of working group meetings. The working group's first day was spent addressing regions within the continental margin, differentiated on the basis of dominant processes: inner shelf transport, air-sea interaction, benthic exchanges, shelf-ocean exchange and water column exchanges. Each working group was asked to say what pilot-level problems within its domain were most important and why and how they might be attacked. Following their deliberations, the groups reported back to the plenary session. At this time, a new series of working groups was formed, on a more geographically oriented basis: eastern boundary current regions, western boundary current regions, tidally dominated shelves, positive

buoyancy input regions and negative buoyancy input regions. Again, the groups deliberated for a day and reported their findings back to the plenary. All told, a number of good, interdisciplinary scientific projects were suggested at the meeting. The possibilities will now be examined, in conjunction with NSF managers, to allow an announcement of opportunity for proposals to be broadcast in early 1991.

A number of other issues were discussed at the final plenary session. Among them was the question of how to provide the needed international aspect of cooperation. Because of the territorial nature of coastal waters, it was decided not to set up a truly international effort of the WOCE or JGOFS sort, but rather to encourage the exchange of information and scholars through a sequence of international scientific meetings. These meetings would also provide a setting that could allow scientists to interact and form small international groups focused on specific projects. Further, some concern was expressed that CoOP may be perceived as a closed shop. Care will be taken to explain CoOP and its objectives at a number of national meetings, and it will be made clear that CoOP welcomes ideas for good science from the entire, broad coastal air and sea community.

A meeting report is now in the process of preparation. Those interested in receiving one should contact the chair of the interim steering committee, Ken Brink (Woods Hole Oceanographic Institution, Telemail/Omnet: K.BRINK). □

SATELLITE IMAGERY AS A RESOURCE FOR TEACHING

By Janet W. Campbell

Satellite imagery and image analysis tools will be introduced into classrooms at all levels (K-12) in two school districts in Maine beginning in the fall of 1990. This program of educational outreach was initiated by research scientists at the Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, Maine, and the Island Institute, Rockland, Maine, in collaboration with teachers and

Janet W. Campbell; Bigelow Laboratory for Ocean Sciences; West Boothbay Harbor, ME 04575.

planners from their local communities. The pilot curriculum will be both *interdisciplinary*—combining science, social studies, mathematics and other subjects—and *intergenerational*—involving students of all ages and adult community members.

Satellite imagery provides a natural focus for integrating academic disciplines. The physical sciences and mathematics are required to understand the technology of remote sensing; earth and environmental sciences, geography and local history are involved in interpreting the images. Students will develop decision-making and communicative skills by working in teams to "ground truth" images, organize the information and report to their local town planners. They will experience computers as valuable tools and science as a quest for answers rather than a collection of known facts.

The program will begin in two neighboring coastal towns in Maine—Boothbay Harbor and Wiscasset—and later be offered to other towns in Maine. Through a grant from Apple Computer, Inc., each school will receive a Macintosh IIfx computer equipped with a color monitor. Image analysis software and satellite images of the land and oceans will be furnished by the Bigelow Laboratory and the Island Institute.

In the first year, each participating school will receive a satellite image of their local area and image analysis software developed by the Island Institute. All students in these towns will be introduced to the technology. Interested primary- and middle-school students will participate with high school science classes to produce a thematic map of their communities. Teams of students and adults will conduct field trips to "ground truth" images, thereby identifying the various types of land cover (wetlands, forests, fields, paved surfaces, etc.) seen as spectrally distinct pixels in the images. New satellite images acquired at intervals of three to five years will be used to study temporal changes in natural habitats and land-use patterns and to build a valuable historical record for the town.

In the second and third years, the curriculum will be expanded to include imagery of the Gulf of Maine, North Atlantic and other regions of the world's oceans. As the spatial scale of their images increases, focus will move from local to regional and finally to global environments over a three-year period. Other schools entering the program in the second year will begin with a local "mapping project" and will draw on the

experiences of the pilot-year teachers and students. A summer workshop for teachers will be conducted each year, and instructional materials will be developed for the widest possible distribution.

The global perspective of remote sensing promises to provide answers to some of the perplexing global ecological problems humans now face. This perspective has given rise to a new science—Earth Systems Science—that views the atmosphere, oceans and land as one interconnected whole. The curriculum goal is not to inspire students to become future scientists, though this may happen in some cases. Instead, our goal is to enable students to become effective citizens of local, regional and global communities by empowering them with the tools and knowledge to make decisions and effect change. Our aim is to engage students in learning about and preserving their environment. Whether students become scientists or not, it is important to provide them with an understanding of the technologies that will affect their lives.

To achieve these goals requires three critical steps: (1) schools must be equipped with the appropriate tools; (2) technical knowledge presently residing in the research community must be translated into a language understood by teachers and students; and (3) a curriculum must be developed, tested and the resultant instructional materials published.

A grant of equipment from Apple Computer, Inc., affords us the opportunity to take the first step. Apple will provide the necessary computer equipment for six schools in the first year (1990-91). There is the possibility to expand the program to twenty schools in the second and third years. Thousands of students in Maine stand to benefit from this program over the next three years.

In 1990, the computers (Macintosh IIfx's) donated by Apple are still rather expensive for most public school budgets. Within the next five years, the computer equipment needed should become more affordable if present trends continue. By that time, we hope to have made progress with steps two and three. Our long-range goal is to produce textbooks and other instructional materials that will enable teachers to bring satellite imagery and remote sensing technology into classrooms anywhere in the world. If we can afford to take all three critical steps, we have an opportunity to affect education in a major way. □

CMOS CONGRESS

THE WINNIPEG CENTRE of the Canadian Meteorological and Oceanography Society (CMOS) will host the Twenty-Fifth Annual CMOS Congress at the Delta Hotel, Winnipeg, Manitoba, Canada, from June 4-7, 1991.

The general theme will be Northern Meteorology and Oceanography. All papers related to physical, chemical and biological aspects of the above theme are especially welcome. Within the general theme, sessions will be held on physical, chemical and biological properties of the Arctic Ocean, ice in the north, the climate and weather of the north, climatic change and northern impacts, Arctic air pollution and northern hydrology. Papers on any topic of interest to CMOS members will also be considered.

Special sessions will be held on prairie storms and applications of chaos theory in meteorology and oceanography. CMOS Committees and Council will meet on June 3, 1991, at the Delta Winnipeg Hotel.

When submitting an abstract, please indicate whether you wish to present your paper orally or have a poster presentation. The Scientific Committee reserves the right to transfer some papers to poster sessions if an excess number of papers have been submitted for oral presentations.

Abstracts should be delivered by February 1, 1991, to: Mr. Rick Lawford; Chairman, Scientific Programme Committee; National Hydrology Research Centre; 11 Innovation Blvd.; Saskatoon, Saskatchewan, Canada, S7N 3H5; Telephone: (306) 975-5756; Fax (306) 975-5143.

For additional information about the location, contact: Mr. Bevan Lawson; Chairman, Local Arrangements Committee; Prairie Weather Centre; 266 Graham Ave., Room 900; Winnipeg, Manitoba, Canada, R3C 3V4; Telephone: (204) 983-4513; Fax: (204) 983-0109. □