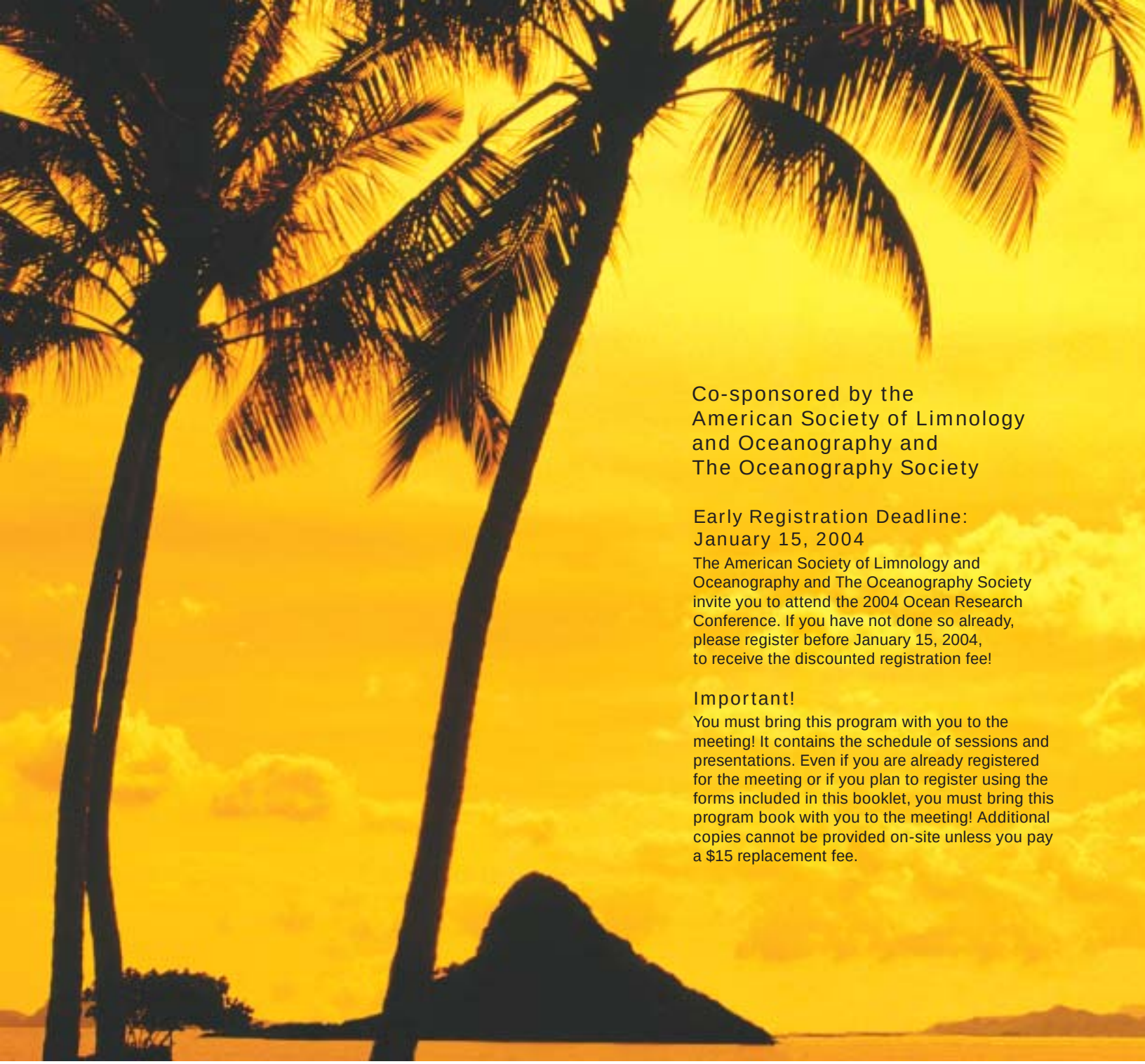

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Important!

You must bring this program with you to the meeting! It contains the schedule of sessions and presentations. Even if you are already registered for the meeting or if you plan to register using the forms included in this booklet, you must bring this program book with you to the meeting! Additional copies cannot be provided on-site unless you pay a $15 replacement fee.

Program

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Contents

Welcome to the 2004 Ocean Research Conference sponsored by ASLO and TOS!

This inaugural meeting brings together the strengths of these two societies and will allow an open exchange of information on issues surrounding ocean research. The 2004 Ocean Research Conference will provide a forum for researchers to highlight recent advances with an emphasis on the integration of aquatic sciences as well as the breadth of ocean research including engineering, industrial, public policy, and marine research.

The scientific program for the 2004 Ocean Research Conference blends the best of both ASLO and TOS meetings and will include plenary presentations, special sessions, and poster sessions. Each day will begin with a set of outstanding plenary presentations. These will be followed by concurrent sessions for oral presentations. Conference poster sessions will be a central part of the meeting and will include an unprecedented number of poster presentations. To emphasize the topical directions of the poster presentations, the poster area will be organized thematically. Authors may present their research during each poster session reception, or they may choose to present only at a preferred time during the week.

2004 Ocean Research Conference Plenary Speakers

Dr. Rita R. Colwell, Director, National Science Foundation

"The Future of Ocean Sciences"

Monday, February 16, 2004, 8:15 to 9:00 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: Ocean research and exploration have crossed a threshold into a new era of discovery. New scientific capabilities, enhanced by molecular biology, genomics, information and communications technologies, and nano science and engineering are opening new paths to understanding the dynamics and complexity of ocean systems at all levels—from the nano to the planetary. Over the coming decades, collaborative international investigations of earth's oceans will provide the understanding needed to realize the benefits of ocean exploration—from climate forecasting to drug discovery to improved stewardship of ocean resources.

Biography: Rita Colwell became the eleventh director of the National Science Foundation on August 4, 1998. Since taking office, Colwell has spearheaded the agency's emphases in K-12 science and mathematics education, graduate science and engineering education/training and the increased participation of women and minorities in science and engineering.

Her policy approach has enabled the agency to strengthen its core activities, as well as establish support for major initiatives, including nanotechnology, biocomplexity, information technology, social, behavioral and economic sciences and the 21st century workforce. In her capacity as NSF director, she serves as co-chair of the Committee on Science of the National Science and Technology Council.

Under her leadership, the foundation has received significant budget increases, and its funding recently reached a level of more than $5.3 billion. Before coming to NSF, Colwell was president of the University of Maryland Biotechnology Institute from 1991 to 1998, and she remains professor of microbiology and biotechnology (on leave) at the University Maryland. She was also a member of the National Science Board from 1984 to 1990.

Colwell has held many advisory positions in the U.S. government, non-profit science policy organizations, and private foundations, as well as in the international scientific research community. She is a nationally respected scientist and educator and has authored or co-authored 16 books and more than 600 scientific publications. She produced the award-winning film, *Invisible Seas,* and has served on editorial boards of numerous scientific journals.

She is the recipient of numerous awards, including the Medal of Distinction from Columbia University, the Gold Medal of Charles University, Prague, the UCLA Medal from the University of California, Los Angeles, and the Alumna Summa Laude Dignata from the University of Washington, Seattle. Colwell also has been awarded 34 honorary degrees from institutions of higher education, including her alma mater, Purdue University. She is an honorary member of the microbiological societies of the UK, France, Israel, Bangladesh, and the U.S. and has held several honorary professorships, including the University of Queensland, Australia. A geological site in Antarctica, Colwell Massif, has been named in recognition of her work in the polar regions.

Colwell has previously served as chairman of the board of governors of the American Academy of Microbiology and also as president of the American Association for the Advancement of Science, the Washington Academy of Sciences, the American Society for Microbiology, the Sigma Xi National Science Honorary Society, and the International Union of Microbiological Societies. She is a member of the National Academy of Sciences, American Academy of Arts and Sciences, and The American Philosophical Society.

Born in Beverly, Massachusetts, she holds a B.S. in bacteriology and an M.S. in genetics, from Purdue University. Colwell received her Ph.D. in oceanography from the University of Washington.

Dr. Eric J. Lindstrom, Oceanography Program Scientist, Office of Earth Science, NASA Headquarters

"The Role of Ocean Research in Developing an Integrated Ocean Observing System for the United States"

Monday, February 16, 2004, 9:00 to 9:30 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: Ocean.US is an initiative to promote implementation of an integrated ocean observing system to meet national needs for detecting and forecasting oceanic components of climate variability, facilitating safe and efficient marine operations, ensuring national security, managing resources for sustainable use, preserving and restoring healthy marine ecosystems, mitigating natural hazards, and ensuring public health. The initiative is the U.S. contribution to a Global Ocean Observing System (GOOS) and reflects the increasing interest of both the executive branch and the legislative branch to establish a sustained earth observing system. In October 2000 the Ocean.US Office was established under the auspices of the National Oceanographic Partnership Program, with nine agencies, to date, having signed the memorandum of agreement for this effort. A full-time staff is supplemented by a committee of users, the U.S. GOOS Steering Committee.

A phased implementation plan has been prepared, and regional associations are being formed to coordinate coastal components. These groups consist of research institutions, non-government organizations, and industries, in addition to state, local, and regional public agencies. The system will be a virtual one— a federation of existing and new elements, providing full and open access to ocean data. Successful implementation and operation of the envisioned IOOS will require unprecedented support of the research community and will, in turn, benefit research efforts significantly. The nation's investment in oceanographic research and development provides the foundation for the initial design, and implementation of IOOS and continued research and development will assure the system remains efficient and effective in the future.

The large scale and permanent observing elements of IOOS will benefit research by providing the framework of observations in time and space required to place research efforts in the context of larger scale systems and permit scaling up and integration with other observations and models. IOOS will require research and development to fulfill its mission. For example new sensors and platform technologies, operational ecosystem models, and advances in telecommunications will be required. Many parts of IOOS cannot be developed until the relevant part of the ocean is better understood. The sustained observations of IOOS will greatly enhance research to understand the causes and consequences of variability revealed by IOOS.

The IOOS will benefit from research. The scientific knowledge, technologies created by scientists and engineers provide the continuing foundation for the design, implementation, and development of the IOOS, and long-term observations made for science projects contribute to overall IOOS goals.

Biography: Eric Lindstrom is oceanography program scientist in the Office of Earth Science at NASA Headquarters in Washington, D.C. He has degrees in earth and planetary sciences from Massachusetts Institute of Technology (1977) and in physical oceanography from the University of Washington (1983). His scientific interests include the general circulation of the ocean and air-sea exchange processes. Lindstrom spent the early part of his career leading research expeditions in the waters around Australia as a member of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO). A native of California, he returned permanently to the United States in 1991 to work on planning for several large experiments of the World Climate Research Program (the TOGA Coupled Ocean-Atmosphere Response Experiment and the World Ocean Circulation Experiment). Over the years he has been a passionate advocate for the development of a global ocean observing system. Before coming to NASA he served as director of the Global Ocean Observing System Project Office in NOAA.

The Office of Earth Science at NASA Headquarters recruited Lindstrom in 1997 to lead its oceanography program. In 2001 he was awarded NASA's Exceptional Service Medal for his success in developing a unified oceanography program at NASA that is well integrated with those of other federal agencies. Under Lindstrom's leadership the NASA Oceanography Program has become a substantial contributor to the National Oceanographic Partnership Program and a more active participant with other agencies in developing the integrated global ocean observing systems of the future.

For the past year he was on loan from NASA as the director of the Ocean.US Office, an interagency endeavor supported by nine federal agencies, created under the auspices of the National Oceanographic Partnership Program.

Dr. Oscar Schofield, Associate Professor, Institute of Marine and Coastal Sciences, Rutgers University

"The Utility of Cabled Systems for In Situ and Remotely Sensed Hyperspectral Optics"
Monday, February 16, 2004, 9:30 to 10:00 a.m.
Ballroom A-B – Hawaii Convention Center

Abstract: An existing set of cabled coastal ocean observatories will be augmented in the near future with an expanding network from newly deployed electro-optic and converted retired telecommunication cables. The cables will provide the researcher several large advantages. The cabled systems will effectively provide unlimited band and power and time series ranging from turbid coastal waters to the deep sea, providing researchers time series data spanning a wide optical gradient. The high bandwidth will allow for hyperspectral data to be collected and delivered back to shore in real-time which is not capable with satellite communications where data needs to be degraded spectrally and temporally to allow for delivery back to shore. Real-time data will allow for algorithm tuning based on real-time in-water measurements of the inherent and apparent optical properties allowing the vicarious calibration of ocean color imagery. Examples taken from the cable at the Long-term Ecosystem Observatory during optical closure studies, inversion techniques, diver visibility algorithms, and bioluminescence light propagation illustrate the potential of cables. Currently there are plans to outfit the many regions of the ocean with high bandwidth cables in the next five years, and the fusing of in situ optics to this expanding network offers great opportunities for biological oceanography. Schofield's talk will highlight the pitfalls and the potential pay-offs that might be encountered in the coming decade.

Biography: Oscar Schofield is an associate professor at Rutgers University at the Institute of Marine and Coastal Sciences. He joined Rutgers in 1995. He had worked before as a food flavor quality microbiologist at the United States Department of Agriculture. He received his Ph.D. from the University of California at Santa Barbara working on the bio-optics of phytoplankton. At Rutgers he, in collaboration with Scott Glenn, formed the Coastal Ocean Observation Lab which has focused on building ocean observatories because the ocean is chronically under-sampled. This resulted in the development of the Long-term Ecosystem Observatory and the New Jersey Shelf Observing System (NJSOS). His research interests include the environmental regulation of phytoplankton community composition in aquatic ecosystems, the physiological ecology of phytoplankton, and the evolution of the modern algae and hydrological optics in optically-complex coastal waters.

Thomas M. (Zack) Powell, Professor, Department of Integrative Biology, University of California, Berkeley

"Links Between Biological and Physical Processes in Lakes, Estuaries, and the Ocean: From the Individual to Global Scales"

Tuesday, February 17, 2004, 8:00 to 8:45 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: Biota in lakes, estuaries, and the ocean encounter the characteristic physical features and processes of aquatic habitats. In most of these environments some (or all) life history stages are planktonic. Accordingly, physical transports play an important role in the flows of energy and the cycling of essential nutrients. Moreover, patterns of population success (e.g., population growth and survival) and community dynamics (e.g., temporal association and succession) are substantially affected. This presentation will review salient examples of the influence that physical transports exert on biological processes (primarily ecological processees) at the individual, population, community, and ecosystem level — up to ocean basin and global scales. Powell will point out insights he has gained from recent studies in lakes, estuaries, and the ocean.

Biography: Zack Powell is a professor in the Department of Integrative Biology, University of California, Berkeley, where he also chairs the Energy and Resources Group. Powell chaired the Scientific Steering Committee for the U. S. GLOBEC program (a contribution to the U.S. Global Change Research Program) from 1992 through 1997, and presently chairs the Steering Committee for Ocean Information Technology (an NSF initiative). He has worked for more than 30 years on physical and biological processes in lakes, estuaries, and the ocean. All have been directed toward the question: How do physical processes, like mixing and turbulence, currents and circulation, or mass and energy transfer at the surface, affect the biological processes in planktonic ecosystems? Most of these investigations have addressed this question directly with field measurements. In addition, with statistical and modeling approaches, Powell has studied the impact of climate, the utilization of remote sensing, and the construction of mathematical and numerical models for aquatic ecosystems. Computer models of planktonic ecosystems in the California Current System, including the larval stages of fish and benthic invertebrates, are a present focus of studies in Powell's laboratory.

Dr. Charles S. Yentsch, Senior Research Scientist, Bigelow Laboratory for Ocean Sciences

"What CZCS Gave Oceanography"

Tuesday, February 17, 2004, 8:45 to 9:15 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: What initiated the interest in ocean color? A short answer: Scandinavian scientists, namely, Sverdrup, Steemenn-Nielson and Jerlov. These early researchers recognized that the color of the ocean could be correlated with the abundance of phytoplankton and hence primary production. For reasons that now seem obscure to the oceanographic community, it took considerable time to realize the value of ocean color. The emergence of satellite measurement happened much sooner. First, a meeting at the National Academy in 1960 largely fleshed out the value of measuring color from space. Secondly, the formation of the CZCS Net Team, NASA's science group for ocean color. The goals of the Net Team were (1) to specify the scientific objectives, and develop algorithms and protocols for measurements and (2) to act as overseers for the validation of products to be dispersed by NASA. The highlight of this effort was a series of research cruises to obtain sea truth. The combination of these efforts provided the basis for image production of regional and global dimensions of chlorophyll and water transparency.

Biography: Charles Yentsch is a senior research scientist at Bigelow Laboratory for Ocean Sciences in West Boothbay Harbor, Maine. He received his B.S. in biology from the University of Louisville, his M.S. in oceanography from Florida State University, and his Ph.D., Honorus causa, from Southampton College, University of Long Island. He also holds degrees in entrepreneurship and intrepreneurship from MIT Sea Grant/NASA.

Since childhood, Yenstch has been a student of the oceans. His understanding of ocean productivity and ocean processes grew during service in the U.S. Navy. This was followed with formal education at Florida State University and the University of Washington, Seattle. He went on to become a scientific leader at Woods Hole Oceanographic Institution and other laboratories. Learning about the sea is his passion. Creating a positive learning environment for others is his obsession. His research and teaching have always been about light - in the lab, at sea, or from space. Semi-retirement allowed a return of attention to tropical waters and coral reef research. Yentsch's focus is the big picture and thus has an outlook of synthesis and systems. The sea is his unit of study. Accordingly, he has led the field of biological oceanography in satellite remote sensing. He was a member of the pioneering NASA Coastal Zone Color Scanner Nimbus-Net Design Team for sensors of ocean color/phytoplankton pigments.

Yentsch has been instrumental in the early starts of several oceanographic institutions including Nova University in Fort Lauderdale, Florida, and the University of Massachusetts, Gloucester Marine Station. In 1974 he was the founder of Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, Maine. Always a major career researcher in addition to being an administrator, he has had principal funding from the NSF, ONR and NASA. Yentsch serves on several editorial boards and national and international committees. His original research and subsequent publications (in excess of 80) have appeared in peer-reviewed professional journals, reviews, and chapters in books. Yentsch was the recipient of the 1999 American Society for Limnology and Oceanography Lifetime Achievement Award.

Robert A. Arnone, Head, Ocean Science Branch, Ocean Division, Naval Research Laboratory, Stennis Space Center

"Satellite Ocean Color for Coastal Processes: The Next Step....."

Tuesday, February 17, 2004, 9:15 to 9:45 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: Advances in satellite ocean color sensing have opened a path for future development in understanding coastal processes. New opportunities for ocean monitoring through the use of space borne spectroscopy offer unique understanding of the pathways of biological, chemical and geological processes, especially in coastal regions. Building on previous ocean color satellite research, advances in in-situ optical instrumentation coupled with quantitative precision radiometric control are facilitating new tools for uncoupling

the optical signatures that can be applied to current and future space borne sensors. These tools extend beyond the traditional chlorophyll monitoring and include the spectral decomposition of in-water optical signatures. These include methods for characterizing coastal particles, dissolved organics matter, phytoplankton pigment compositions and bottom contributions. For the first time, ocean color satellites permit description of the spatial and temporal changes in biological, chemical and geological processes. Multiple looks per day using satellite color spectroscopy enable methods to track the changes of optical properties (and the associated water composition) and follow their evolution and fate within the coastal margin. For example, it is possible to trace the dispersion of different river plume signatures and monitor biological events and determine growth and decay processes.

However, future directions for coastal oceanography can extend beyond development of new satellite tools for ocean sensing. Within the last 10 years, significant advances have occurred in physical ocean models: advances in computational power permit high horizontal and vertical resolution of physical processes that together with advances in the assimilation of altimeter derived sea surface height, SST and other in situ fields provide for an accurate representation of the physical environment. Within the next decade, new directions will be extended to bio-optical and sediment re-suspension models using space borne ocean sensing capabilities at finer time and spatial scales. Our ability to understand, monitor and predict the coastal environment extends beyond satellite ocean sensing and their limitations. We look for methods to use satellite spectroscopy fused with physical numerical models to determine the coupling of physical and bio-optical processes. However, the new techniques for assimilation of satellite ocean optical properties into bio-optical and geological models are the challenge for the future.

Biography: Robert Arnone is a recognized national and international scientist conducting research in the areas of coastal oceanography and optical processes for the last 20 years. His expertise bridges the basic ocean research with operational oceanography. Presently he heads the Ocean Science Branch in the Ocean Division at the Naval Research Laboratory in Stennis Space Center which is a recognized leader in ocean processes. He leads over 50 world leading oceanographers in naval research, which specializes in 1) ocean optical processes and remote sensing, 2) biological modeling of coupled dynamical processes, and 3) fine scale and meso-scale physical processes. His branch is currently involved in basic, exploratory and applied research in ocean sciences which links research with the operational navy. He has used ocean studies to enhance the performance of navy optical and surveillance systems.

Arnone has led major international expeditions in the Mediterranean, Arabian Sea, Japan Sea, Gin Sea and U.S. coastal waters specializing in physical oceanography, optical remote sensing and biological processes using ships, aircraft and satellite sensors. His branch is a leader in at-sea measurements in advanced optical instrumentation, mooring deployments, and surface wave measurement, in addition to satellite receiving and aircraft remote sensing of the sea surface. His specific research has led to the development of new ocean color algorithms and satellite processing based on new techniques of atmospheric correction and in-water hydro-optical research. His research has pioneered the use of satellite ocean color for understanding coastal ocean processes.

He has been on numerous ocean science teams for NASA and Navy programs and represented the U.S. in delegations in coastal oceanography. Arnone is adjunct faculty to the University of Southern Mississippi Marine Science Department since 1989 and the University of Southern Alabama. He serves on several graduate student committees. He is a board member of the Alliance for Marine Remote Sensing (AMRS). Arnone has received awards for naval honors for science transitions and NRL Alan Berman publication awards. He has received Navy patents and NASA honors for astronaut training programs. He has over 60 publications and 200 presentations. He received a B.S. in geology from Kent State and an M.S. in geochemistry from Georgia Institute of Technology and completed advanced studies in physical oceanography at Louisiana State University.

Dr. Ronald C. Baird, Director, National Sea Grant College Program, and Associate Director for Ocean Research, Office of Oceanic and Atmospheric Research, National Oceanic and Atmospheric Administration

"The Urban Ocean: A New Imperative for Coastal Resource Management"

Wednesday, February 18, 2004, 8:00 to 8:45 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: The historical trend to urbanization in the distribution of human populations has reached unprecedented levels, and the urban proportion of the global population is expected to grow to 60 percent or higher in a generation or 80 million urban inhabitants per year. In the U.S. alone, 174 million acres, an area larger than the state of Texas is expected to be urbanized (inclusive of suburbs) by 2025. The great majority of urban areas are located on or near the coast. Urbanization is being increasingly recognized as among the most dramatic, complex and dynamic of human induced changes to coastal ecosystems. While adverse impacts are significant and growing, we are far from an adequate understanding of the cumulative impacts of urbanization on associated ecosystems. Furthermore, fragmentation among institutions of governance, lack of resources for environmental management/research and the difficulty of enforcement, contribute to the need for a new national imperative for comprehensive, ecosystem-based approaches to the management of human activity in urban environments. This is an enormous task, and the temporal urgency of the issues mandates timely focus on these emerging multiple challenges by federal/state/local agencies. A comprehensive initiative by the National Sea Grant Program to specifically address urban problems is described. The program involves research, engagement of stakeholders and public education. Four major areas of focus are highlighted: urban dilemmas, non-point pollution, ports/harbors and coastal planning.

Biography: Ronald Baird is the director of the National Sea Grant College Program and the associate director for ocean research within the National Oceanic and Atmospheric Administration's Office of Oceanic and Atmospheric Research (OAR), NOAA's principal line office for research. As Sea Grant's director, Baird manages a national network of over 200 institutions and over 3,000 individuals that engage in scientific research, education, and extension activities in every coastal and Great Lakes state. As OAR's ocean research director, he coordinates the aquatic research efforts of 12 federal laboratories and major extramural programs such as the National Undersea Research Program. Baird currently serves as

the United States' marine resources co-chair for the U.S.-Japan Cooperative Program in Natural Resources and has helped initiate the international Sea Grant network.

He brings a background in science, business, and academic administration to his position at NOAA. He holds a Ph.D. in biological oceanography from Harvard University, an M.A. in zoology from the University of Texas at Austin, and a B.S. in zoology from Yale University.

Prior to joining NOAA, Baird served as vice president of university relations and director of corporate relations at Worcester Polytechnic Institute (WPI), the nation's third oldest engineering college. During that period, he was appointed by the Secretary of Commerce to the National Sea Grant Review Panel and served as its chair from 1992-1994. Before coming to WPI, Baird was president and vice president of Schuster Corporation, an investment holding company. He also served as director of research at Geo-Marine, Inc., an engineering and environmental consulting firm in Dallas, Texas.

He also spent nine years as a professor of marine science at the University of South Florida in St. Petersburg. His published works include contributions to the biology of deep sea fishes, encounter theory and natural resource management. Baird is a lifetime member of Sigma Xi and a fellow of the American Institute of Fisheries Research Biologists. In 2000, he received the Presidential Rank Award for helping position the U.S. as a world leader in marine research and the sustainable development of coastal resources.

Dr. Jonathan P. Zehr, Professor, Department of Ocean Sciences, University of California, Santa Cruz

"Molecular Underpinnings of the Global Nitrogen Cycle: New Perspectives on Old Problems"

Wednesday, Feb. 18, 2004, 8:45 to 9:15 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: The factors controlling nitrogen uptake and assimilation have been one focus of biological oceanography. The nitrogen cycle, including uptake and assimilation processes, is composed of biogeochemical transformations catalyzed by enzymes encoded on genes within genomes. Recent work on cultivated and uncultivated microorganisms using molecular biology and genomics has shown that the abilities to use different nitrogen sources, including nitrate, urea and dinitrogen, are not universally distributed among microorganisms. Both genomic analyses and environmental data on the distribution of nitrate reductase have shown that cyanobacteria and bacteria are not all capable of using nitrate as a nitrogen source. In contrast, previously unappreciated cyanobacteria have been shown to be important nitrogen fixers in the open ocean, as well as in microbial mats. The genetic capabilities of populations of cyanobacteria to use nitrate, nitrite, ammonium and dinitrogen can be defined in relation to the light-nutrient gradient in surface waters. Coupled with process-oriented interrogation of natural populations by quantifying genes and mRNA of specific organisms, the roles of different cyanobacterial groups in the use of different nitrogen sources is being determined. Ultimately, the future reward of the molecular and genetic approach will be in the application of genetic and genomic information to re-examine the fundamental questions of the sources, fates and fluxes of nitrogen in the ocean.

Biography: Jonathan Zehr has been a professor in the Department of Ocean Sciences at the University of California, Santa Cruz, since 1999. Biological oceanography, microbial ecology, molecular biology, nitrogen cycling, nitrogen fixation are his major interests. Prior to his present position, Zehr was an associate and assistant professor at Rensselaer Polytechnic Institute in Troy, New York, and also worked as the associate director of the Rensselaer Polytechnic Institute's Fresh Water Institute. He was a research assistant professor at State University of New York in Stony Brook, New York, and was a visiting scientist in the Department of Cell Biology at the National Institute of Basic Biology in Okazaki, Japan. Zehr was also a research collaborator at Brookhaven National Laboratory in Upton, New York, and was a graduate research assistant at the University of California in Davis, California.

He received his B.S. degree in biology from Western Washington University and his Ph.D. from the University of California-Davis. His thesis was entitled, "Dissolved organic nitrogen metabolism and bacterial amino acid metabolism in Castle Lake, California" (Ecology-Limnology. 1985.).

Zehr has received a number of honors in his career including Distinguished Visiting Lecturer, Texas A&M University, College Station, Texas, 1996; Bermuda Biological Station Starr Fellowship, 1988; National Research Council Research Associateship, 1985-1986; National Science Foundation Predoctoral Fellowship, 1981-1984; Jastro-Shields Research Fellowship, University of California, Davis, California, 1983 and Outstanding Student in Biology, Western Washington University, 1981. His CV lists over 70 total representative publications.

Mark R. Abbott, Dean and Professor, College of Oceanic and Atmospheric Sciences, Oregon State University

"Ocean Remote Sensing in the Next Decade: Opportunities and Challenges"

Wednesday, Feb. 18, 2004, 9:15 to 9:45 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: The last two decades have seen significant advances in our understanding of global and mesoscale ocean processes, made possible in part by the availability of research-quality satellite data sets. Spaceborne ocean observations have revealed new phenomena and enabled research of processes that have characteristic time and space scales that are not amenable to in situ sampling. The number of papers utilizing satellite has increased, with nearly 30% of the papers appearing in JGR Oceans in 2001 directly using satellite data. Much of the data used in these analyses is derived from research missions, such as those developed and operated by NASA. The next ten years will experience a fundamental shift as we move from research-driven missions to operations-driven missions. Such a transition may enable the collection of multi-decadal data sets that are essential for the study of climate-scale processes. Such sustained, systematic measurements provide both benefits and risks, and the research community must prepare for a remote sensing environment where science is not the only requirement. Although there remain scientific and technical challenges in satellite remote sensing of the ocean, the programmatic issues associated with building a sustained, research-quality, comprehensive ocean observing system are daunting.

Biography: Mark Abbott is dean and professor in the College of Oceanic and Atmospheric Sciences at Oregon State University. He received his B.S. in conservation of natural resources from the

University of California, Berkeley, in 1974 and his Ph.D. in ecology from the University of California, Davis, in 1978. He has been at OSU since 1988 and has been dean of the college since 2001. Abbott's research focuses on the interaction of biological and physical processes in the upper ocean and relies on both remote sensing and field observations. He chairs the U.S. Joint Global Ocean Flux Study Science Steering Committee for NSF and the Climate Monitoring Working Group for NOAA. He is the incoming chair of the Board of Governors for CORE.

Dr. Scott Doney, Associate Scientist, Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution

"Interannual Variability of the Extratropical Ocean Carbon System"

Thursday, February 19, 2004, 8:00 to 8:30 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: The extra-tropical oceans exhibit considerable physical variability on interannual and longer time-scales associated with regional climate modes such as the North Atlantic and Pacific Decadal Oscillations and the Antarctic Circumpolar Wave. Corresponding variability is found in most biological and chemical time-series records of marine productivity, air-sea CO^2 flux and community composition. Growing efforts are attempting to explain mechanistically this variability of the ocean carbon cycle on these time-scales via simple conceptual models involving forcing of mixed layer depth (light), nutrient supply, and dust deposition. Illustrations will be shown that draw from oceanographic time-series and a hierarchy of numerical simulations.

Biography: Scott Doney received his Ph.D. in 1991 from the MIT/WHOI joint program in chemical oceanography and served as a post-doc and scientist from 1991 to 2002 at the National Center for Atmospheric Research. Currently, he is an associate scientist in marine chemistry and geochemistry at Woods Hole Oceanographic Institution.

Dr. Jacqueline Grebmeier, Research Professor, Department of Ecology and Evolutionary Biology, University of Tennessee

"Biological Implications of Arctic Change to Carbon Shelf-Basin Exchange"

Thursday, February 19, 2004, 8:30 to 9:00 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: The detection of biological change in the Arctic marine environment coincides with recent observations of high-latitude environmental change, including a seasonal reduction in the extent and duration of sea ice, increased seawater temperature, and changing hydrographic conditions. High latitude ecosystems are projected to be particularly sensitive to climate change, and the shallow, productive features of the Bering Strait region may dictate its role as a sentinel indicator of global change effects. Recent studies show that the northern Bering Sea is shifting towards an earlier spring transition between ice-covered and ice-free conditions, with coinciding changes in both primary and secondary trophic level production. These apparent changes could lead to dramatic impacts for higher-trophic level fauna, including some species such as benthic-feeding walrus, bearded seals, gray whales and diving seaducks that are of cultural and subsistence significance to Arctic Native peoples. Ecosystem change on the shallow shelves of the northern Bering and Chukchi Seas are intimately connected to systems further to the north. Current studies as part of the Western Arctic Shelf-Basin Interactions (SBI) global change project are investigating the production, transformation and fate of carbon at the shelf-slope interface in the northern Chukchi and Beaufort Seas, downstream of these productive shallow western Arctic shelves, as a prelude to understanding the impacts of a potential warming of the Arctic. The importance of the Ameriasian Arctic region in the context of pan-Arctic shelf-basin exchange will be discussed.

Biography: Jacqueline Grebmeier is a research professor in the Department of Ecology and Evolutionary Biology at the University of Tennessee. Her research interests include pelagic-benthic coupling, benthic carbon cycling, and benthic faunal population structure in the marine environment; understanding how water column processes influence biological productivity in Arctic waters and sediments, how materials are exchanged between the sea bed and overlying waters, and documenting longer-term trends in ecosystem health of Arctic continental shelves. Some of her research includes analyses of the importance of benthic organisms to higher levels of the Arctic food web, including walruses, gray whale, and diving sea ducks, and studies of radionuclide distributions of sediments and within the water column in the Arctic as a whole. Grebmeier is the director of the Shelf-Basin Interactions Project Office, member of the National Academies Polar Research Board, chair of the Pan-Arctic Shelf-Basin Exchange working group for the Arctic Ocean Sciences Board, science steering committee member for the Study of Environmental Arctic Change (SEARCH) program, member of the U.S. International Polar Year 07/08 planning group, and a past member of the U.S. Arctic Research Commission. She earned her Ph.D. in biological oceanography in 1987 from the University of Alaska, Fairbanks.

Dr. John Pandolfi, Curator, Paleobiology Department, National Museum of Natural History

"The Nature, Timing, and Causes of Global Coral Reef Decline"

Thursday, February 19, 2004, 9:00 to 9:30 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: There is now overwhelming evidence that ecological change is occurring everywhere on living coral reefs, resulting in altered communities with potentially reduced species diversity. Throughout the Caribbean, Pleistocene data indicate a structure to reef coral communities that persisted to the 1980's, when rapid habitat degradation led to the collapse or severe alteration of coral communities. Paleo time-series data (biological and proxy) provides an effective means of linking the pristine and seemingly stable pre-human state of reefs with their present degraded and seemingly changing state. Degradation of coral reef ecosystems began centuries to millennia ago. Trajectories of decline are strikingly similar worldwide. These historical analyses can now be used to predict future ecosystem states – allowing managers to anticipate probable losses of species and habitats at individual locations through an understanding of the characteristic pattern of ecosystem decline. Overfishing and pollution appear to be fundamental causes of reef decline, but more recent episodes of mass mortality following bleaching and disease have heavily damaged already stressed coral reefs.

Biography: John Pandolfi is curator in the paleobiology department at the National Museum of Natural History. His research aims mainly to use the recent past history of reef corals in understanding the ecology of coral reefs. He was awarded his Ph.D. in 1987 from the University of California-Davis, where he examined the evolutionary paleobiology and paleoecology of colonial marine animals. Subsequently, Pandolfi held post-doctoral fellowships at the Australian Institute of Marine Science, the Australian National University, and the Smithsonian Tropical Research Institute in Panamá. He has carried out fieldwork in Papua New Guinea, the Bahamas, Florida, East Africa, Egypt, Brazil, and Colombia. He has published over 50 articles in leading international journals, including Science and in premier journals in the fields of ecology, marine science, and paleobiology, including American Zoologist, Ecological Monographs, Evolution, Limnology and Oceanography, and Paleobiology.

Pandolfi has served as advisor to the U.S. Congress on "Coral Reefs at Risk: Challenges and Solutions," as an invited member of the Scientific Committee on Ocean Research (SCOR) Working Group 104 - "Coral Reef Responses to Global Change: The Role of Adaptation;" as an advisor to the Brazilian government on "Brazilian Coral Reefs: Research, Integrated Management and Conservation"; and as a UNESCO/SCOPE workshop participant on "Coral Reef Ecosystem Function and Biodiversity." He has shared the position of editor-in-chief of Paleobiology with William DiMichele since September 2001. Pandolfi's current research directions include: 1) investigate the ecological dynamics of coral communities over broad spatial and temporal scales; 2) understand the effects of local, regional, and global environmental change on past and present species distribution patterns; 3) aid resource managers in understanding the natural patterns of variation of coral reefs prior to the influence of man; and 4) understand the evolutionary history that has led to the high diversity of reef corals on living coral reefs.

Dr. Barbara Block, Charles and Elizabeth Prothro Professor Chair in Marine Sciences, Stanford University

"Hot Tuna: Oceanographic Insight from Electronic Tagging and Animal Oceanographers"

Thursday, February 19, 2004, 9:30 to 10:00 a.m.

Ballroom A-B – Hawaii Convention Center

Abstract: Top pelagic predators such as tunas, sharks, turtles and marine mammals have historically been difficult to study due to their size, speed and range over the vast oceanic habitat. In recent years the development of small microprocessor-based data storage tags that are surgically implanted or satellite-linked provide marine researchers a novel avenue for examining the movements, physiology and behaviors of pelagic vertebrates. When biological and physical data from the tags are combined with satellite-derived oceanography, the relationship between the movements and behaviors of organisms can be linked to environment. Tag-bearing marine animals can function as autonomous ocean profilers providing oceanographic data wherever their migrations take them. These new animal-collected oceanic data complement more traditional methodologies for ocean observation. Marine organisms provide a level of temporal and spatial coverage in three dimensions that is impossible to replicate using standard sampling methods. The data generated from this approach provides a novel "organism-eye" view of critical habitats and migratory corridors on an ocean basin scale.

Block and her colleagues have deployed over 1000 electronic tags on Northern bluefin tuna in the Atlantic and Pacific oceans. The tagging data are providing new insights into their seasonal movements, habitat utilization, breeding behaviors and population structures in both oceans. In addition, the data are revealing migration corridors, hot spots and physical oceanographic patterns that are key to understanding how northern bluefin tunas use the open ocean environment. Similar data are now being obtained simultaneously for many other pelagic species in the Tagging of Pacific Pelagics (TOPP) program. The TOPP project will employ a range of electronic tags (archival, satellite-linked ARGOS and GPS devices) to examine the distribution and behavior of these pelagic organisms in relationship to the dynamic ocean environment of the North Pacific. Pilot projects involving the simultaneous tagging of tunas, sharks, sea turtles, albatross and elephant seals are generating a novel view of how top predators use the North Pacific ecosystem. TOPP animal oceanographers have to date recorded over a million temperature depth profiles in the North Pacific. These new technologies provide data that are vital for obtaining insights on how these animals use their oceanic habitat. Electronic tagging data sets are an important element in the evolving concept of ecosystem-based fisheries management.

Biography: Barbara Block received her Ph.D. from Duke University and was a post-doctoral fellow at University of Pennsylvania. She currently holds the Charles and Elizabeth Prothro Professor Chair in Marine Sciences at Stanford University. Her research is focused on how large pelagic fishes utilize the open ocean environment. Investigations center upon understanding the evolution of endothermic strategies in tunas, billfishes, and sharks. Block and her colleagues investigate the cellular mechanisms underlying heat generation and force production in skeletal muscle, the evolution of endothermy, and the physiological ecology of tunas and billfishes. Block has become actively engaged in fisheries oceanography and ocean policy. The research in the lab is interdisciplinary, combining physiology, ecology, and genetics with oceanography and engineering.

Block and colleagues at the Monterey Bay Aquarium have also established the Tuna Research and Conservation Center, a unique facility that permits physiological research on tunas. They are employing new techniques in wildlife telemetry and molecular genetics to directly examine the short and long-term movement patterns, stock structure and behavior of tunas and billfishes. The fish are highly exploited in international fisheries and effective management of existing biodiversity requires an understanding of their biology and population structure. The Block lab actively engages in research at sea to understand the movements and physiological ecology of tunas and billfishes and to gain insight into the selective advantage of endothermy in fishes.

She and her colleagues have been conducting research and development of electronic tags for tracking of ocean wildlife. The tags are essentially computers that record navigational information, body temperature, pressure and ambient temperature data. The information gained with these tags will improve our understanding of the biology of these species and increase our knowledge of stock structure. The successful implementation of the novel satellite and archival tag technology has provided marine researchers with new tools for studying inaccessible marine vertebrates.

Block is a recipient of the Presidential Young Investigator Award from the National Science Foundation, the MacArthur Foundation Fellowship, and a Pew Marine Conservation Fellowship.