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Center for Coastal Physical Oceanography, Old Dominion University

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CCPO, ODU, and Internet2

The National Science Foundation recently provided funding to **GLEN WHELESS**, research assistant professor, and David Harnage, ODU's Vice President of Administration and Finance, to allow CCPO and ODU to take advantage of newly available high performance Internet bandwidth. This grant has allowed CCPO to complete its connection to the very high speed Bandwidth Network Service (vBNS), which is serving as the new "Internet fast lane" for research centers and universities that need networking capabilities beyond those of the commercial Internet. The vBNS is a network resource focused on the development and implementation of meritorious high performance applications, services, technologies, and protocols for the U.S. research and education community. It became operational in April 1995 and now has an OC-12 (622 megabits per second) infrastructure linking the major U.S. supercomputing centers and other Network Access Points (NAPs). Our OC3 (155 megabits per second) connection is one of the first ten to be completed and will serve as a springboard for future high performance computing initiatives.

In conjunction with the high performance vBNS connection, CCPO and ODU have recently joined in partnership with other members of the national university community, government, and industry to accelerate the next stage of Internet development in academia, which is known as Internet2. The Internet2 project is a parallel effort linked with our high performance network initiative and is focused on the development of a new family of advanced applications to meet emerging academic requirements in research, teaching, and learning. All aspects of science, engineering, and the humanities will ultimately be affected by what is being constructed now. One can think of Internet2 as an entire system, where the networking hardware and software infrastructure serve as the glue for the three other components, that is, the instrumentation, the high performance computational assets, and the high capacity data servers.

Internet2 addresses major challenges facing the next generation of university networks by creating and sustaining a leading edge network capability for the national research community. Applications are being developed and deployed that fully exploit the capabilities of broadband networks, media integration, interactivity, and real time collaboration. Examples of the types of applications that fully exploit the capabilities of vastly improved networking include those for

telemedicine, interactive collaboration, virtual reality, and remote scientific experimentation.

At the recent Internet2 Members Meeting, CCPO researchers participated in a demonstration of the power of Internet2 applications. **GLEN WHELESS**; **CATHY LASCARA**, research assistant professor; **LARRY RAMEY**, programmer; and **BRANDON HILL**, undergraduate research assistant, used the high performance connection to the vBNS to link the Center's projection-based VR device, known as the Immersadesk, with two other similar devices (one located at the meeting in Washington D.C. and another in Chicago). Participants at all three sites were able to collaboratively interact with each other using a distributed Virtual Reality application developed at the Electronic Visualization Laboratory at the University of Illinois at Chicago, one of CCPO's collaborative partners.

Notes from the Director

Maybe I'm getting old, but I thought one of the reasons most of us became oceanographers was that we liked something about going to sea. We could have practiced science in many ways but we chose oceanography. Whether it was the view, the starry night sky, the green flash, the camaraderie, the thrill of discovery, or the practice of science there is something about going to sea, even for a day, that makes the difference.

The article by **LORRAINE HEILMAN** and **KRIS HOLDERIED** reminded me of all this. They write about the research activities of one of our young faculty, **ARNOLDO VALLE-LEVINSON**, and his faculty and student colleagues. These scientists are experiencing everything from the frustrations of instrument installation and recovery to long hours on small boats in big waves. Maybe what we all have in common is seasickness! It is our common bond.

If you accept the premise that most people pursue advanced degrees in oceanography for many reasons but with a common reason of occasionally getting to sea I ask "Are new students getting at sea experiences?" I think not.

All of us who are in the position to help get students gain an ocean experience should do all we can to assure that experience. Students are with us for only a short time, and there are many demands on their time; however, I think the at sea experience is vital and must be accommodated.

As for students and young oceanographers, your life is relatively simple now (that will change), and you DO have time for going to sea. Talk to your professor, advisor, or supervisor and get to sea. That time and the experiences will serve you well.

Larry P. Atkinson
Director, Center for Coastal Physical Oceanography

Sigma Xi

In 1984, the Tidewater Virginia Chapter of Sigma Xi, a national scientific research society, was formed and included faculty from Old Dominion University (ODU), Norfolk State University (NSU), and the Eastern Virginia Medical School (EVMS). More recently, the Chapter expanded to include participants from Christopher Newport University and Hampton University. The general objective of the local chapter is to facilitate the goals of Sigma Xi. However, perhaps a more important function of the local chapter is to maintain scholarly and collegial interactions among the many university campuses that co-exist in the Hampton Roads region. To provide opportunities for the diverse membership to meet and interact with one another, the Tidewater Virginia Chapter of Sigma Xi sponsors several social events each academic year. This year, one of the fall events, which was coordinated by EILEEN HOFMANN and consisted of munchies, beverages, and good conversation, was held on the back lawn of CCPO on September 26. In addition to many from CCPO, Sigma Xi members from other academic departments at ODU, Christopher Newport University, Hampton University, and EVMS attended. The weather cooperated to provide a nice fall afternoon which encouraged sitting outside and exchanging stories about classes, the latest research project, or what to do on holidays. All in all, it was an enjoyable time and the mixture of individuals provided new perspectives on how different universities handle

the same types of issues. The next events hosted by the Tidewater Virginia Chapter of Sigma Xi will be at Christopher Newport University (in November) and at the Eastern Virginia Medical School (In February). For additional information on Sigma Xi, please check http://www.sigmaxi.org.

Introduction to Parallel Programming on the WWW

During September and October 1997, **BRUCE LIPPHARDT, JR.**, research assistant professor, participated in a World-Wide Web (WWW) virtual workshop entitled ``Introduction to Parallel Computing and Programming Languages'' which was organized and administered by the Cornell Theory Center (CTC), a high-performance computing and interdisciplinary research center at Cornell University. This virtual workshop project was funded by the U.S. Department of Defense Major Shared Resource Centers.

The workshop was structured to give individuals familiar with Unix and a scientific programming language (either Fortran or C) an introduction to the concepts of parallel computing. Participants were introduced to the advantages and disadvantages of parallel programming and to a library of routines that comprise the Message Passing Interface (MPI) standard. The MPI routines can be called from either C or Fortran, and provide a powerful tool for extending existing serial programs to a parallel environment.

Workshop participants completed web based modules at their own pace over a six week period. Many of the modules had programming lab assignments which could be completed interactively via the web using a cluster of IBM RS/6000 SP nodes located at CTC. Each module ended with a short multiple choice quiz and a module evaluation form, both completed via the WWW. Quizzes were scored automatically, and each participant's quiz results were displayed immediately through the WWW, giving feedback on how well the material was understood. Course completion certificates will be mailed to participants who completed all lab assignments and module evaluation forms.

Bruce felt that the workshop was well structured, informative, and entertaining. He had no experience with parallel programming prior to participating in the workshop, and he feels it provided an excellent introduction with several practical tips and examples. Using the WWW to present the workshop material allowed for a creative mix of text, figures, and animations. Additionally, the HTML format permitted a more natural organization of the topics, and allowed for layers of detail in the subject matter that could be accessed as needed by the participant based on his or her experience. The ability to run lab exercises on an IBM 6000 cluster was also useful, providing real-time experience with parallel programs running on a high performance parallel cluster.

Information about the Cornell Theory Center is available at http://www.tc.cornell.edu.

COMMENTARY: HF Radar

The feature article on HF radar in the previous issue of *CCPO Circulation* (Vol. 4, No. 4) generated surprising interest among readers. Below are a few commentaries in response to that article. The first is by Alejandro Souza from the University of Wales, who reports on some recent research that workers in Europe are doing with HF technology. Then Robert Stewart from Texas A&M University, one of the pioneers in the development of this technology, makes a comment about scientists and engineers collaborating on early developments and about the expected differences between HF radar and conventional current measurements. It is hoped that the reader will gain additional and worthwhile knowledge of HF radar from these follow up commentaries.

by Alejandro J. Souza

School of Ocean Sciences, University Of Wales Bangor, Menai Bridge, Anglesey, UK. Now at Division of Applied Sciences, Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA.

HF radar is one of the relatively new instruments that, together with ADCPs and undulators, have revolutionized

coastal oceanography. The main problem with HF radar is that the systems are too expensive to be widely available. Nevertheless, HF radar has played an important role in European coastal oceanography since the late 80s. Scientists from Hamburg now use CODAR while scientits from the Natural Environment Research Council (NERC) use OSCR.

Since 1985, British researchers have used HF radar to study flow around sand banks and to study the dynamics of tidal and residual circulations in the eastern Irish Sea. HF radar has been used extensively as part of many oceanographic studies, including detail studies of currents in Liverpool bay, fluxes through the Bristol Channel, observations of frontal processes on the Flamborough front in the North Sea, and one-year long observations to study Fluxes through the Dover straits and North Channel. At the moment, the NERC OSCR is being used in the Ebro River region to study the dynamics of this region of freshwater influence and its interaction with the shelf-slope, and in the near future will be shipped to Antarctica to do further oceanographic measurements. Other non-conventional use of OSCR includes the measurement of short wave directionality. The Hamburg group have used CODAR in the German Bight, the Norwegian Channel, the Dead Sea, the North Sea, the Baltic, and the Rhine outflow region.

To increase the potential use of HF radar, it appears to me, that there are two options: to build cheaper systems, as they have done with ADCPs, but this is highly unlikely; or to convince the funding agencies, such as NSF and ONR, to buy these systems and let researchers submit proposals for HF radar time in the same way as you apply for ship time. This is the way it is in the UK where NERC owns the system, and once the OSCR time has been allocated, the researcher only pays installation and running costs.

by Robert Stewart

Department of Oceanography, Texas AM University, College Station, TX

As one of the ``pioneers" of the technology, I read with interest the article on HF radars. May I make two comments? First, oceanographers and engineers working together developed HF techniques. Second, in my opinion, HF measurements of currents were never widely used because the ``current" measured by the radar is not the "current" of interest to most oceanographers. The radar measures a weighted depth-average of: 1) geostrophic currents; 2) Ekman currents; 3) currents associated with the logarithmic boundary layer in the first few meters below the sea surface; and 4) the wave-drift current. The last two may be the same. Thus, the radar measure neither the surface current important for tracking oil spills, nor the current used in models of the ocean circulation.

Because so many processes influence the radar, I expect there will be 10-20 cm/s difference between radar measurements of current and conventional measurements of current. There is better agreement with spar buoys whose length is selected to measure the same currents measured by the radar.

Journal of the James River Cruise Project

by Lorraine Heilman, Oceanographic Research Associate
and Kris Holderied, Research Assistant

James River cruises...three words designed to strike instant fear into the hearts of oceanography students at ODU. Students see me, **LORRAINE HEILMAN** coming down the halls at CCPO or the oceanography building and hide (actually they pretend to not see me, while they are hiding). Understanding Arnoldo's optimistic vision is a bit more difficult after 13-14 hours of rocking and rolling on a small boat.

Chapter 1 - "In the Beginning": Before there were James River cruises, **ARNOLDO VALLE-LEVINSON**, assistant professor, along with co-conspirators Drs. Kamazima Lwiza of SUNY Stony Brook and Kuo Chin Wong of the University of Delaware, had an idea. "Let's get scientists from three Universities, two ADCP's, and two CTD's, put them into five small boats and sample for 25 hours straight," he said with a straight face. "Oh yes, and don't forget the two moored ADCP's, wave gauges, S4 current meters," he added without batting an eye. And thus was born the James River Project. Arnoldo then began to plan his attack on the mighty river. Four cruises were planned the first year and

six the second, with four cross-river transects sampled on each cruise. Ideally, two boats would be used to tow ADCPs (measuring current velocity) and two boats would be used to conduct CTD stations (measuring temperature and salinity). A fifth boat was used as a support boat to ferry people and equipment between the boats and the shore, as necessary. Of course, the most popular destination was the marina restroom (these were small boats, after all). The point of all this was to gain an understanding of the transverse (across the river) structure of the flow field, both tidally and after the tide was statistically removed from the data. Different times of the year and phases of the tides were chosen to show changes in the flow patterns for varying river discharge conditions. Differences in local weather conditions during the cruises were also expected to contribute to variability in the flow fields. Data from the CTD stations would identify corresponding changes in water properties, including temperature, salinity, and density.

Boats were procured from a number of different sources; equipment was checked, counted, and checked again. Ingenious designs for locating stations and coordinating the ADCP and CTD sampling were developed. Finally, all was in readiness and on August 28, 1996, the very first James River Cruise was launched with much fanfare and optimism.

Chapter 2 - "An Auspicious Start": The first cruise went remarkably well. Small research vessels were rented and loaned from nearby research institutes, including VIMS, the NOAA office in Chesapeake, VA, Hampton University, not to mention ODU's own fleet and several private boats. The James River fleet was deployed with remarkable efficiency and ease. The weather was good, food was plentiful, and it was a pleasant, albeit long day for most of the participants. The confidence this inspired made us think things would be as easy in the future. The data were good and caused much excitement in our intrepid leader. "Do you see how well we have elucidated the flow?" he exclaimed excitedly. However, rumors started circulating among students that volunteering for these excursions was not exactly the vacation from lab that it seemed to be, and, for some reason, those on the night crew (running from about 7:00 p.m. to 8:00 a.m. the next morning) were the least excited about future cruises.

Chapter 3 - "In the Eye of the Storm": Weather predictions were not promising for the second cruise on the James. Hurricane Fran was approaching and headed directly for the James River Bridge. Although conditions appeared grim, the hardy scientists decided to sally forth and spit in the eye of the hurricane as it were. After a rousing pep talk ("I would not wish one scientist more... and those who were not here will sit at home in their nice warm dry kitchens and wish that they had sailed with us..."), Arnoldo and his happy band of researchers went out to sample what they could. As the wind started howling and the rain blew horizontally across the ever steepening waves, it became clear that this cruise would have to be aborted. At this point, most of the marine radios were working only intermittently at best, so Arnoldo realized that he would have to check on the rest of the research boats in person. Below is an excerpt from the journal of the driver of the support boat (Brian Parsons) on that day.

Arnoldo crossing the James: Being a smooth operator, Arnoldo faced the approaching hurricane with the coolness of a pitcher in the bottom of the ninth inning of the seventh game of the World Series. Nervous voices clucked on the crackling radios---the hurricane was on the way. We plowed our way through the swells to assess the moods and spirits of each of the boats, rather than from impressions gleaned from the radio. Arnoldo, ever the dashing character, rose and stood tall on the bow of *ODU3*, turning his baseball cap backwards and clutching the bow line for stability. Repeatedly, we would dive into the troughs of the swells, then burst through the crests. This raging tempest could not squash his determined spirit, nor could it diffuse his scientific drive---he was thumbing his nose at the forces conspiring to end his cruise only after 10 hours of data collection. As we crashed our way towards ODU 1, he let go of the line with one hand, turned, and with a devilish grin barked at me as if I were a private on the first day boot camp, **"FASTER! FASTER!!"**

Chapter 4 - "Arnoldo, Can You Hear Me?": Happily, everyone survived the day with no permanent injuries beyond the memories of seasickness to battle the river again, and soon. They took to the river again in October and November 1996 for two more 24-hour cruises. The many volunteers were willing and cheerful, the scientific equipment was ready, and the boats worked; unfortunately the marine radios refused to cooperate. Using hand signals across the choppy waters, the different boats communicated messages as complicated as "the batteries in the CTD appear to be somewhat low on charge, what shall we do?" to each other.

Chapter 5 - "Sometimes Things Go a Little Wrong": The radios weren't the only things that often had mechanical troubles, since few cruises passed without the breakdown of at least one small boat. These problems ranged from the

simple, "*ODU2* is out of gas again," to the difficult, "we've lost reverse, we can't go backwards anymore, how are we going to maneuver to station?", to the downright oppressive. At about 8:30 at night on the August 1997 cruise, the alternator on one of the ADCP boats stopped working. After moving all the equipment to another boat and sending them out to do both CTD and ADCP work from the same boat, a valiant attempt was made to fix the alternator. After finding a marina that stocked alternators for our 25 year old engine, we woke up the owner and convinced him that science never sleeps and that he needed to sell us an alternator now, at 10:00 p.m. Unfortunately, when we finally got everything installed and were ready to connect the last wires, we noticed a minor problem. There were four wires coming out of the new alternator and only three points of attachment to the engine. Sometimes knowing when to quit is a good thing.

KRIS HOLDERIED, one of Arnoldo's hardy graduate students, doesn't know that, though. She was out at night on a strange boat in the pouring rain with a crew of completely inexperienced students doing both ADCP and CTD operations because another boat had already broken down when one or two things went wrong. "Kris, Kris, the GPS (Global Positioning System, used to accurately find the location of the boat on a continuous basis for the ADCP and also needed to steer the boat on the proper course) doesn't work." Kris countered that with ease, switching to a backup LORAN positioning system, and continuously recording locations by hand. A few minutes later, after completing one CTD station, with a sudden "poof" the generator failed, preventing use of the ADCP. After lots of unsuccessful attempts to reestablish generator power, while the boat pounded through the rain and wind, they decided just to take CTD stations, since all the necessary equipment could be run on batteries. Murphy's Law was still in control, however, since the LORAN then stopped working as they drove toward the first station. So, finally, with no way of knowing where they were and no power, even these intrepid scientists had to quit for the night and limp back to port. For the students it was a somewhat dramatic introduction to the vagaries of fieldwork.

Chapter 6 - "Gourmet Food as Mutiny Prevention": As if it wasn't enough to run around securing boats, finding volunteers, calling marinas, and creating different and ever changing plans of attack on the river, we also decided that we needed to feed all the cruise participants (you try being out on the water for 14 hours with a tired AND hungry crew). It was tricky to accomodate the variety of palates of our crew (including vegetarians!) and our limited budget, but after a few attempts we developed a winning menu ... or at least one that prevented mutiny, anyway:

turkey and cheese sandwiches;
bologna and cheese sandwiches;
cheese sandwiches; PB&J sandwiches; and
fruit/crackers/cookies/sodas/water.

Chapter 7 - "Neither Rain, Nor Sleet, Nor Dead of Night": Sometimes the weather was good, and these warm, pleasant days out on the water were perfect for getting good data and made all the planning worthwhile. When the wind and waves picked up, the rain pounded down, or things started breaking, it was just the signal that we were in the midst of another adventure, with the challenge of improvising solutions while on the water. We can safely say that it was a tremendous learning experience for all involved. To see the scientific results of some of these cruises, please visit our web site at: http://www.ccpo.odu.edu/~arnoldo/transverse/transcope.html.

Chapter 8 - "Advice From Past James River Cruisers": (1) don't eat tortilla chips on open boats, they get slippery when mixed with water; (2) if you're going to be out on an open boat at night in November for 12 hours, don't wear shorts; (3) bring lots of coffee; (4) don't tell your spouse you are on a 20' boat in a hurricane; and (5) **"Faster! Faster!!"**

Puzzler

The purpose of the *Puzzler* is to record thought-provoking questions and problems that have appeared on comprehensive, qualifying, and candidacy exams. Readers are encouraged to submit their own favorites, as well as to attempt to answer all questions. All communications should be directed to: **wizzard@ccpo.odu.edu**. Wizzard will acknowledge the sources of all questions/problems used and will publish selected thought-provoking (not necessarily correct) answers to previous submissions.

The second puzzler question of 1997, **Question 97.2**, was introduced in the last issue of *CCPO CIRCULATION* (Vol. 4, No. 4). Wizzard will first answer **Question 97.2** before posing **Question 97.3**.

Answer to Question 97.2: The potential energy of the unstratified state is greater than the stratified state. Since the center of mass of a representative water column is raised, the mixing process converts internal energy (presumably heat) into potential energy. The correct answer was posted by oss134@sos.bangor.ac.uk. wayne@kai.com correctly noted that the entropy of the system was increased. Benoit.Cushman-Roisin@Dartmouth.EDU also correctly noted that the drop in temperature caused by the decrease in internal energy produces a thermal contraction (unless the water is already at maximum density). This will cause a decrease in the center of mass. Beniot.Cushman-Roisin speculates that in the final state, the center of mass is raised, but there is no change in the absolute height of the water column.

Question 97.3 is a contribution by Beniot Cushman-Roisin of Dartmouth. Beniot "cooked" up the question years ago, but he has never asked it at student comprehensive exams. Instead, Beniot offers the question as a thought question in his teaching.

Question 97.3. Consider water being cooled from above, such as a lake in winter. The cooling on the surface is a removal of heat (energy) from the system; yet, it creates a top-heavy water column capable of releasing potential energy into kinetic energy for convective motions. How is this possible?

CCPO Seminar Series: Spring 1998

During the academic year, CCPO invites several distinguished scientists to prese nt seminars on topics related to coastal oceanography. The lectures take place in Room 109, Crittenton Hall, Old Dominion University on Mondays at 3:30 p.m. **Eileen Hofmann**, professor of oceanography, coordinates the lecture series with the assistance of **Beverly Scott**, office services specialist. Below is a schedule of lectu res for the spring semester 1998. For more information or to be included on the maili ng list for lecture announcements, please contact Beverly at (757) 683-4945 or beverly@ccpo.odu.edu. Specific lecture topics are announced one week prior to each lecture. Titles and abstrcts of the seminars can be found at http://www.ccpo.odu.edu beginning January 20, 1998.

Date	Lecturer	Institute
January 26, 1998	**John Klinck**	*Center for Coastal Physical Oceanography*
February 2, 1998	**Carl Fisher**	*Elizabeth River Project, Norfolk, VA*
February 16, 1998	**David Basco**	*Civil Engineering, ODU*
February 23, 1998	**Eileen Hofmann**	*Center for Coastal Physical Oceanography*
March 2, 1998	**Chunyan Li**	*Center for Coastal Physical Oceanography*
March 16, 1998	**Sandy Shumway**	*Southampton University*
March 23, 1998	**Sybil Sietzinger**	*Rutgers University*
March 30, 1998	**Mark Patterson**	*Virginia Institute of Marine Science*
April 6, 1998	**John Walsh**	*University of South Florida*
April 13, 1998	**Mercedes Pascual**	*Center for Marine Biotechnology, University of Maryland*
April 20, 1998	**Kris Holderied**	*Center for Coastal Physical Oceanography*

Just the *facts* . . .

Appointments

L. P. ATKINSON, new Chair of the University-National Oceanographic Laboratory System (UNOLS), Fleet Improvement Committee.

Appointments

M.S.: A. G. E. HASKELLE. E. Hofmann. Eddie willpursue his Ph.D. studies at the University of Rhode Island starting in January.

Grants/Contracts Awarded

L. A. CODISPOTI, "Denitrification and Nitrous Oxide Cycling in the Arabian Sea," NSF subcontract with the New York State Department of Health, $121,585.

G. F. COTA, "Estabishment of an Automated Coastal Monitoring Station for Bio-Optical Ocean Properties Using a NOAA Weather Platform," NASA with NOAA (C. E. Woody), subcontract, $44,000.

E. E. HOFMANN, "Long-Term Ecological Research on the Antarctic Marine Ecosystem: An Ice-dominated Environment," University of California, $45,219.

G. H. WHELESS, "Effects of External Forcing and Turbulent Mixing on the Dynamics of Estuarine Plume," NSF, $60,000.

Presentations

L. P. ATKINSON, "Physical Transport Between the Continental Margins and the Open Ocean" JGOFS/LOICZ Workshop on Non-Conservative Fluxes in the Continental Margins, Texel, The Netherlands, October 6-9, 1997.

G. F. COTA, "Sea Ice Bio-Optics," Old Dominion University, Department of Oceanography, Norfolk, VA, September 19, 1997.

A. G. E. HASKELL; **E. E. Hofmann**; and Gustav-Adolph Paffenhofer and Peter Verity, both at Skidaway Institute of Oceanography, "Modeling Plankton Community Structure Under Environmental Forcing on the Southeastern U.S. Continental Shelf," ICES Symposium on the Role of Physical and Biological Processes in the Recruitment Dynamics of Marine Populations, Baltimore, MD, September 22-24, 1997.

E. E. HOFMANN, "Modeling Diseased Oyster Populations," Chesapeake Biological Laboratory, Solomons, MD, October 31, 1997.

W. Fraser, Montana State University and **E. E. HOFMANN**, "*Euphausia superba* Longevity and Implications for the Structure and Function of the Antarctic Marine Ecosystem," ICES Symposium on the Role of Physical and Biological Processes in the Recruitment Dynamics of Marine Populations, Baltimore, MD, September 22-24, 1997.

E. E. HOFMANN; **J. M. KLINCK**; M. Dekshenieks, University of Rhode Island; and E. Powell, Rutgers University, "The Effect of Environmental and Biological Factors on the Larvae of the Eastern Oyster (*Crassostrea virginica*) Larvae: Simulation Results," ICES Symposium on the Role of Physical and Biological Processes in the Recruitment Dynamics of Marine Populations, Baltimore, MD, September 22-24, 1997.

M. Kobayashi, Yokohama College of Commerce; **E. E. HOFMANN**; and **J. M. KLINCK**, "Can the Japanese Oyster

Grow in Chesapeake Bay?" Fall Meeting of the Oceanography Society of Japan, Kagoshima, Japan, October 7-9, 1997.

C. LI; **A. Valle-Levinson**; J. O'Donnell and H. Li, University of Connecticut; K.-C. Wong, University of Delaware; and K. M. M. Lwiza, State University of New York, Stony Brook, "Tidal Wave Induced Mass-Flux Across Shallow Estuaries," The Third International Symposium on Ocean Wave Measurement and Analysis (Waves '97), November 3-7, 1997, Virginia Beach, VA.

M. C. PARASO, **E. E. Hofmann**, **J. M. Klinck**, and S. E. Ford and E. N. Powell, both at Rutgers University, "Modeling Environmental Effects on MSX Prevalence and Intensity in Eastern Oyster (Crassostrea virginica) Populations," the 14th Biennial Estuarine Research Federation International Conference, The State of Our Estuaries, Providence, RI, October 12-16, 1997.

C. Friedrichs, Virginia Institute of Marine Science; **A. VALLE-LEVINSON**; K.-C. Wong, University of Delaware; and K. M. M. Lwiza, State University of New York, Stony Brook, "Transverse Circulation Associated with Lateral Shear in Tidal Estuaries," Mid-Atlantic Bight Physical Oceanography and Meteorology (MABPOM), Brookhaven National Laboratory, Upton, NY, November 13, 1997.

A. VALLE-LEVINSON, **C. Li**, **T. Royer**, and **L. P. Atkinson**, "Flow Pattersn at the Chesapeake Bay Entrance," Horn Point Environmental Laboratory, October 1, 1997, and also presented at the Mid-Atlantic Bight Physical Oceanography and Meteorology (MABPOM), Brookhaven National Laboratory, Upton, NY, November 13, 1997.

Publications

W. T. Sturges, Univesity of East Angtlia, United Kingdom; **G. F. COTA**; and P. T. Buckley, CIRES, University of Colorado, "Vertical Profiles of Bromoform in Snow, Sea Ice and Seawater in the Canadian Arctic," *Journal of Geophysical Research*, 102, 25,073-25,083, 1997.

A. VALLE-LEVINSON and K. M. M. Lwiza, State University of New York at Stony Brook, "Bathymetric Influences on the Lower Chesapeake Bay Hydrography," *Journal of Marine Systems*, 12, 221-236, 1997.

ADK's Words of Wisdom

"...all our science measured against reality is primitive and childlike, and yet it is the most precious thing we have."

Albert Einstein

Contributed by James Baker, Undersecretary of Commerce and Director of NOAA.

Blue Crab Bowl

The Department of Oceanography of Old Dominion University and the Virginia Institute of Marine Science of the College of William and Mary announces the first Blue Crab Bowl to be held in the new Oceanography Building on the Old Dominion University campus in Norfolk, Virginia on Saturday, February 28, 1998. The Blue Crab Bowl is an academic tournament in which high school teams will compete, in the style of the old "College Bowl" program, to answer questions that deal with the oceans. The champion of the Blue Crab Bowl will receive an all-expense paid trip to Washington, DC to represent the Mid-Atlantic Region in the National Ocean Science Bowl on April 25-27, 1998. The National Ocean Science Bowl is a joint effort between the Consortium for Oceanographic Research and Education and the National Marine Educators Association and is an International Year of the Ocean educational event. If you would like to obtain more information about the National Ocean Science Bowl, please access the World Wide Web

site: http://core.cast.msstate.edu/nosb.html, or contact the Blue Crab Bowl Coordinators at ODU: ELIZABETH SMITH via e-mail at lizsmith@ccpo.odu.edu or via phone at (757) 683-5567 and ANNE WEST-VALLE via e-mail at anne@ccpo.odu.edu or via phone at (757) 683-5558.

ATTENTION: The Blue Crab Bowl is in need of volunteers to work as Science Judges, Rules Judges, Moderators, Scorekeepers, Timekeepers, and more. Please consider helping out! Contact Anne or Liz to volunteer for this outstanding outreach event.

CCPO CIRCULATION staff:

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