

Chair’s Message

Bruce M. Howe, Chair



We are very pleased to welcome Professor Zhenhua Huang to ORE. Professor Huang is coming from Singapore and has a wide variety of ocean engineering experience and interests. The family, wife Lixia and daughter Kelly, is living in Manoa, within walking distance of the University and Mid-Pacific Institutes where Kelly is going to school.

This last fall a number of students have graduated with outstanding dissertations and reports: Austin Barnes, Richard Carter, Masoud Hayatdavoodi, Justin Stopa and J. Patrick Anderson. Justin is going to IFREMER in Brest, France. Bright futures to all!

I’d like to welcome our new students Derek Linsley and Jonathan Koons, who started this fall, and Matt Wesley who will start this spring.

This newsletter is just slightly on the late side, but this allows me to with the whole ORE ohana, Hau’oli Makahiki Hou—Happy New Year!

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Editor’s Corner

Jonathan Koons, TA



When I found out I was coming here, it was one of the happiest moments in my life. Nothing since then has changed that feeling. This is a serious institution of higher learning, yet at the same time, it is balanced with a sense of laughter and joy. Every time I see Dr. Howe wearing sandals I can’t help but smile. As the new TA, it’s hard to follow in the footsteps of Yaprak and Masoud, they have done such a wonderful job. I hope you enjoy this edition of Hana O Ke Kai...

Student News

- **Austin Barnes** defended his MS Plan A Thesis “Using Laser Scanning to Investigate Changes in Beach Morphology During Swell Events” on September 17, 2013.
- **Richard Carter** defended his Ph.D. Dissertation “Wave Energy Capture: The Focusing of Wave Induced Flow Through a Submerged Surface” on November 5, 2013.
- **Masoud Hayatdavoodi** defended his Ph.D. Dissertation “Nonlinear Wave Loads on Decks of Coastal Structures” on November 21, 2013.
- **Justin Stopa** defended his Ph.D. Dissertation “Periodicity and Patterns of Global Wind and Wave Climate” on November 22, 2013.
- **James Anderson** defended his MS Plan B Presentation “Modeling a Two Body Wave Energy Converter” on November 27, 2013.
- **University of Hawai’i SNAME Student section** won the Student Microsite Design Competition. Check the website @ <http://www.sname.org/UniversityofHawaiiStudentSection/Home/>

Some Recent ORE Publications

Bai, Y. and **Cheung, K.F.** (2013). Dispersion and nonlinearity of multi-layer non-hydrostatic free-surface flows. *Journal of Fluid Mechanics*, 726, 226-260.

Cheung, K.F., Bai, Y., and Yamazaki, Y. (2013). Surges around the Hawaiian Islands from the 2011 Tohoku tsunami. *Journal of Geophysical Research: Oceans*, 118(10), 5703-5719, doi: 10.1002/jgrc.20413.

Lay, T., Ye, L., Kanamori, H., Yamazaki, Y., **Cheung, K.F.**, and Ammon, C.J. (2013). The February 6, 2013 M_w 8.0 Santa Cruz Islands earthquake and tsunami. *Tectonophysics*, 608, 1109-1121.

Lay, T., Ye, L., Kanamori, H., Yamazaki, Y., **Cheung, K.F.**, Kwong, K., and Koper, K.D. (2013). The October 28, 2012 M_w 7.8 Haida Gwaii underthrusting earthquake and tsunami: Slip partitioning along the Queen Charlotte Fault transpressional plate boundary. *Earth and Planetary Science Letters*, 375, 57-70.

Quiroga, P.D. and **Cheung, K.F.** (2013). Laboratory study of solitary wave transformation over bed-form roughness on fringing reefs. *Coastal Engineering*, 80, 35-48.

Stopa, J.E., **Cheung, K.F.**, Tolman, H.L., and Chawla, A. (2013). Patterns and cycles in the Climate Forecast System Re-analysis wind and wave data. *Ocean Modelling*, 70, 207-220.

VanUffelen L, Nosal E-M, Howe B, Carter G, Worcester PF, Dzieciuch MA, Heaney KD, Campbell RL, Cross PS (2013). Estimating uncertainty in subsurface glider position using transmissions from fixed acoustic tomography sources. *J. Acoust. Soc. of Am* 134(4) Pt.2, 3260-3271.

Nosal E-M (2013). Methods for tracking multiple marine mammals with wide-baseline passive acoustic arrays. *J. Acoust. Soc. of Am* 134(3), 2383-2392.

Nosal E-M (2013). Chapter 8: Model-based marine mammal localization methods. In: Eds. O Adam and F Samaran, Detection Classification and Localization of Marine Mammal using Passive Acoustics – 10 years of progress. Dirac NGO, Paris.

Young J, Host-Madsen A, **Nosal E-M** (2013). Impulsive source separation with application to sperm whale clicks, Proceedings of the 2013 IEEE Digital Signal Processing workshop, Napa California. 6 pp.

Schwartz, A.K., **Ertekin, R.C.** and Riggs, H.R. (2013). Coupled Dynamics of a Floating OTEC Platform Design with a Cold Water Pipe. Report submitted to the National Marine Renewable Energy Center, DOE, UH Manoa, July, 30 pp.

Korde, U. A. and **Ertekin, R.C.** (2014). On wave energy focusing and conversion in open water. *Renewable Energy-An International Journal*, Vol. 62, February, pp. 84-99.

Zhao, B.B., Duan, W.Y. and **Ertekin, R.C.** (2014). Application of Higher_Level GN Theory to some Wave Transformation Problems. *Coastal Engineering Journal*, Vol. 83, January, pp. 177-189.

Ardhuin, F., T. Lavanant, M. Obrebski, L. Mari'e, J.-Y. Royer, J.-F. d'Eu, **B. M. Howe**, R. Lukas. J. Aucan, A numerical model for ocean ultra low frequency (ULF) noise: wave-generated acoustic-gravity and Rayleigh modes, *J. Acoust. Soc. Am.*, 134, 3242-3259 (2013).

Chandrayadula, T. K., K. E. Wage, P. F. Worcester, M. A. Dzieciuch, J. A. Mercer, R. K. Andrew, and **B. M. Howe**, Reduced rank models for travel time estimation of low mode signals, *J. Acoust. Soc. Am.*, 134, 3332-3346 (2013).

Chandrayadula, T. K., J. A. Colosi, P. F. Worcester, M. A. Dzieciuch, J. A. Mercer, R. K. Andrew, and **B. M. Howe**, Observations and transport theory analysis of low frequency, acoustic mode propagation in the Eastern North Pacific Ocean, *J. Acoust. Soc. of Am.*, 134, 3144-3160 (2013).

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Publications & Events

Recent ORE Publications... continued from page 2

Stephen, R. A., S. T. Bolmer, M. A. Dzieciuch, P. F. Worcester, R. Andrew, J. A. Mercer, J. A. Colosi, and **B. M. Howe**, Deep seafloor arrivals in long range ocean acoustic propagation, *J. Acoust. Soc. Am.*, 134, 3307-3317 (2013).

Taniguchi, N., C.-F. Huang, A. Kaneko, C.-T. Liu, **B. M. Howe**, Y.-H. Wang, Y. Yang, J. Lin, X.-H. Zhu, and N. Gohda, Measuring the Kuroshio current with ocean acoustic tomography, *J. Acoust. Soc. Am.*, 134, 3272-3281 (2013).

Udovychenkov, I. A., M. G. Brown, T. F. Duda, P. F. Worcester, M. A. Dzieciuch, J. A. Mercer, Rex K. Andrew, **B. M. Howe**, J. A. Colosi, Weakly dispersive modal pulse propagation in the North Pacific Ocean, *J. Acoust. Soc. Am.*, 134, 3386-3394 (2013).

Van Uffelen, L.J., E.M. Nosal, **B. Howe**, and G.S. Carter, P.F. Worcester, M.A. Dzieciuch, K.D. Heaney, R.L. Campbell, and P.S. Cross, Estimating uncertainty in subsurface glider position using transmissions from fixed acoustic tomography sources, *J. Acoust. Soc. Am.*, 134, 3260-3271 (2013), DOI:<http://dx.doi.org/10.1121/1.4818841>.

Worcester, P. F., R. K. Andrew, A. B. Baggeroer, J. A. Colosi, G. L. D'Spain, M. A. Dzieciuch, K. D. Heaney, **B. M. Howe**, J. N. Kemp, J. A. Mercer, R. A. Stephen, and **L. J. Van Uffelen**, The North Pacific Acoustic Laboratory (NPAL) deep-water acoustic propagation experiments in the Philippine Sea, *J. Acoust. Soc. Am.*, 134, 3359-3375 (2013).

Rajagopalan, K. and **G.C. Nihous**, "An Assessment of Global Ocean Thermal Energy Conversion Resources under Broad Geographical Constraints," *Journal of Renewable and Sustainable Energy*, 5, 063124, 11 p., 2013.

Nihous, G.C., "Maximum Wave Power Absorption by Flexible Line Attenuators," *Applied Ocean Research*, 43, 68-70, 2013.

Rajagopalan, K. and **G.C. Nihous**, "An Assessment of Global Ocean Thermal Energy Conversion (OTEC) Resources With a High-Resolution Ocean General Circulation Model," *Journal of Energy Resources Technology*, 135, 041202, 9 p., 2013.

Upcoming Meetings and Conferences

2014 Ocean Sciences Meeting Co-sponsored by ASLO, TOS and AGU in Honolulu, Hawaii from February 23-28, 2014.

<http://www.sname.org/UniversityofHawaiiStudentSection/Home/>



33rd International Conference on Ocean, Offshore and Arctic Engineering (OMAE2014) in San Francisco, California June 8-13, 2014. Deadline January 6, 2014. <http://asmeconferences.org/omae2014/>



OCEANS'14 MTS/IEEE Conference in St. John's, Newfoundland, Canada from September 14-19, 2014. <http://www.oceans14mtsieestjohns.org/>



24th International Offshore (Ocean) and Polar Engineering Conference will be held in Busan, Korea from June 15-20, 2014. <http://www.isopec2014.org>



2014 International Conference on Coastal and Ocean Engineering will be held in Dubai, UAE from April 4-5, 2014. <http://www.iccoe.net/>



30th Symposium on Naval Hydrodynamics will be held in Hobart, Australia from November 2-7, 2014. <http://www.snh2014.org>



Inside ORE

ORE Students Awarded Graduate Paper Honor Prize by the Society of Naval Architects and Marine Engineers

ORE MS students of the Fall 2012 capstone design class, Austin Barnes, John Casilio, Michael Frederick, Jerica Nolte, and Andrew Schwartz were awarded the Graduate Paper Honor Prize from the Society of Naval Architects and Marine Engineers for "The Conceptual Design of a Floating Offshore Wind Turbine Farm for Oahu, Hawai'i." This paper was originated out of the report of a design course taught by Professor Gerard Nihous. The paper utilized the award winning semi-submersible platforms designed by Dominique Roddier. Dominique Roddier's design of a three-legged semisubmersible floating wind turbine, a first by a US company, won the Excellence in Renewable Energy Award in Innovation. He received his PhD. from Berkeley in 2000 and was an MS student of Professor Ertekin at UH.



Michael Frederick and Jerica Nolte accepting their award.



ORE Flashback

Yingan Xu, Minglun Wang, Dayun Wang, and Xiling Che were also awarded the Graduate Paper Honor Prize in 1990 by the Society of Naval Architects and Marine Engineers for their paper "Two Dimensional Hydroelastic Analysis of Very Large Floating Structures." And yes, that *is* Professor Ertekin in the middle.

Inside ORE

Three Reasons to be a SNAME and MTS Member

Yaprak Onat



As a teaching assistant of the ORE department for two years, I had a great opportunity to reach you as an editor of the newsletter. Since I passed the torch to Jonathan, I had a chance to continue William Templeton and Jerica Nolte's legacy as Marine Technology Society (MTS) and Society of Naval Architects and Marine Engineers (SNAME) student section chair, respectively. I attended their leadership training as a chair in San Diego (MTS) and Houston (SNAME) this year and learned more detailed information about the opportunities that these two societies provide, which will be beneficial for your professional and student life.

#1 Reason: FAME

"If you show me your friend, I can tell you who you are." This proverb emphasizes that the people you know will improve you and reflect your life vision. SNAME and MTS give you an opportunity to network with industry and academy people. This means that you can be professional buddies with those who share your vision. This will create career opportunities for yourself and maybe your other society-related friends. You can link to worldwide organizations, access the experts, and share experiences. Societies have cooperative agreements with other societies which will allow you to organize or attend meetings and publish at discounted rates. Did you also know that SNAME and American Society of Naval Engineers (ASNE) has joint membership?

Let's say you move to a city. Your fame network will help further connect you to local young professionals, or if you have a struggle in your project, you can ask for guidance from one of your many expert friends. You can present a seminar in the student section and let the societies spread your research far and wide. SNAME and MTS opens a platform for you to become an ocean engineering rockstar -- the annual symposiums, expos and international conferences will be your stage.

#2 Reason: MONEY

As a poor graduate student, you may think that even though the student rates are cheap compared to regular membership fees, society membership is still a "luxury." Thanks to our student section academic adviser Prof. Ertekin, if you want to be a new member, first year fees of 10 students are reimbursed by the department. Also, MTS gave lots of students free membership this year. Furthermore, student membership is around the cost of two movie tickets per year, so it is not that far out of reach. The Young Professional membership rate is also lower than a full membership for SNAME, so until you stand on your feet, it is a good opportunity to stay connected. The career center allows you to post your resume for free; create a job search; look for internships.

Another advantage for students are scholarships, scholarships and scholarships! The pros are reaching out to invest in the future leaders of our industry. Moreover, you can gain professional recognition through awards and research programs.

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Inside ORE-Recent Ph.D Dissertation Abstracts

Wave Energy Capture: The Focusing of a Wave Induced Flow Through a Submerged Surface

Richard Carter

A submerged impervious horizontal disk is positioned near the free surface. Piercing this body is a tubular section, having an opening flush with the top surface and extending completely through the body. Waves passing over this surface will induce an oscillating fluid flow within this tubular section. The magnitude of the oscillation is dependent upon the structure's dimensions relative to environmental conditions such as the wave period, the wave height and submergence depth, as well as the extent to which surface waves are focused within this region. Both the numerical and experimental results of this phenomenon, which are pertinent to the development of a new wave energy converter, are described. The flow within the opening of the submerged surface is modeled by use of the Green's function method within the confines of linear potential theory. The numerical predictions are compared with the experimental data. Monochromatic waves propagate over the submerged surface of a free-standing disk model, i.e., placed away from any flume walls. The wave-induced flow through the submerged surface is measured by two different sensors, an electromagnetic flow sensor and a particle image velocimetry laser. Wave elevation is recorded using capacitive-type wave gauges. Phasing of wave elevation to the vertical velocity through the tubular section is also discussed. Of the parameters that were varied, decreasing the submergence depth of the disk resulted in the most significant increase in vertical wave-induced velocity.

Nonlinear Wave Loads on Decks of Coastal Structures

Masoud Hayatdavoodi

Water waves are known to be the ultimate agents of failure of the deck of structures located near the shore lines. Coastal bridges, piers, jetties and docks are among these structures, which under certain environmental conditions, such as severe storms and hurricanes, may become exposed to destructive waves. The decks of these structures may partially be removed or completely washed out as a result of the wave-structure interaction. Examples are severe damages made to coastal bridges and jetties during Hurricane Katrina (2005) and, Tohoku tsunami (2011).

This Ph.D. is concerned with the theoretical calculations of two-dimensional nonlinear wave loads on a horizontal deck of a coastal structure located in water of finite depth. Two different approaches are used to calculate the wave-induced horizontal and vertical forces and overturning moment. One is based on the theory of directed fluid sheets, namely the Green-Naghdi (GN) theory of water waves, and the other is based on Euler's equations. The forces on the deck are calculated by integrating the time-dependent pressure around the body.

Periodicity and Patterns of Global Wind and Wave Climate

Justin Stopa

Wind-generated waves propagate across the oceans transporting energy that shapes the shorelines, influences maritime commerce, and defines coastal land-use around the world. Understanding the role of the ocean wind and wave climate is imperative for ocean engineering practices with both societal impacts and scientific contributions. The focus of this dissertation is the description of the patterns and cycles of the wind and wave climate through the use of reanalysis datasets that cover 1979 to 2009. The dissertation consists of three major parts, which examine the validity of reanalysis datasets for climate research, verify climate signals in the datasets with published indices, and explore the dominant modes of variability. The data shows the relationship with published indices of known atmospheric cycles of the Arctic Oscillation (AO), Antarctic Oscillation (AAO), and El Nino Southern Oscillation (ENSO) in both the wind and wave fields. The analysis reveals that the Atlantic is saturated by signals from the Northern Hemisphere including a broad range of intra-seasonal components similar to those of the AO. The Indian and Pacific are strongly influenced by inter-annual cycles from the ENSO and AAO. In addition, these two oceans have strong components with periods of 50-90 days that have similar spatial structure to those with 2-5 year periods suggesting linkage between the two frequency components.

New in ORE

Faculty

Zhenhua Huang

ORE welcomes Dr. Zhenhua Huang as the new Assistant Professor. Dr. Huang was an Assistant Professor at the School of Civil and Environmental Engineering at Nanyang Technological University in Singapore since 2006 and taught at Hong Kong University of Science and Technology from 2003 to 2006. Dr. Huang specializes in marine energy, hydrodynamics of ocean waves, coastal and ocean engineering, coastal sediment transport, coral reef hydrodynamics and tsunami hazard mitigation. He will be teaching Near-shore Processes and Sediment Transport this spring.



Students

Guilio Gambacciani



Hi everybody! I am a visiting scholar from Italy. I am finishing my Masters in Naval Architecture and Marine Engineering at the University of Genoa, but I am carrying out my Masters Thesis here at ORE. I am really thankful to Professor Ertekin for allowing me to come to Honolulu and work at a Wave Energy Converter device. Renewable energy is a serious issue and it is an honor for me take part in a department that is very advanced in this field. I think ORE is a great department because of the excellent knowledge of the professors and, moreover, because of the people. It has been easy to make friends among the

students and the professors are always available to help us. In my free time I take pictures, practice surfing, play soccer, sail, snowboard, hike, write poems and travel the world. Living in Hawaii is a dream come true. It is very interesting meeting people from all over the world and discovering new cultures. I think that it is very important for young students to travel because it allows them to open their minds. I was born in the Tuscany hills near Florence so since I was young the feeling with the nature has been very important to me. This is the reason that when I was 18 years old I decided to study a marine-science discipline. I am really glad for this experience in Ocean Engineering in a place that we could call, the Ocean State.

New in ORE

Random Thoughts about coming to ORE and Hawaii

Jonathan Koons



1. I could eat Kalua Pig every day.
2. My favorite professor is (insert name here). I've learned a lot so far, and everyone, in their own way, has made me laugh often.
3. The view from the fourth floor of Holmes Hall still staggers me. I try to spend a few seconds each day in admiration.
4. It's possible that I've been asked about the tides 10,000 times in my life. And sure, I could always tell someone what the tide was doing on a certain day, but I never truly understood the tides mathematically until I came here.
5. If I had to guess, I'd say Yefei works about 100 hours a week.
6. Automatic locking apartment doors are bad. A landlord that refuses to give you a spare key is worse.
7. I used to have to fill up my gas tank every four or five days. I've been here since August and I'm on my second tank.
8. The students and professors are smart here.
9. \$100 goes to the first person that can get Professor Cheung on a surfboard.
10. \$1.53 goes to the first person that can convince Professor Ertekin to grow a mustache again.
11. Why is it so cold in some of the classrooms?
12. Not that I'm qualified to be anyone's life coach, but if you can, go to the seminars. Professor Nihous, Natalie, the rest of the faculty, and the speakers go to a lot of trouble to do this for us.
13. Thank you Linyan and Andrew for your time during the SOEST Open House. The kids seemed to enjoy themselves. They might have even learned a thing or two.



A brief stop on the way to ORE

Alumni

John Casilio

Here is a picture of John and his family after he finished his time at the Naval Diver and Salvage Training Center's Marine Engineer Dive Officer Course. Upon completion John started a new job as the Ocean System's IPT Lead at Naval Air Warfare System Command's Program Management Division. His office funds and coordinates the construction and maintenance of undersea instrument training and tracking ranges in Kauai, California, and Florida.



Three Reasons to be a SNAME and MTS Member continued from page 5...

#3 Reason: You are special...but so is everyone else.

It is important to improve yourself in your profession so that you can be "the guy" in your area. SNAME and MTS give you an opportunity to dive into a deep variety of their resources to benefit your personal development. They allow training and development of leaders in the industry through their involvement. They provide opportunity to contribute and stay current to the collective knowledge of your profession via their free newsletters or discounted publications. You can participate in research and improve your education via online courses, workshops, peer reviewed bulletins and reports. You can attend a Professional Engineering review course to help you renew you license. Another plus is that everything is either discounted or free.

In summary, SNAME and MTS are a big loving ohana for new graduates and students. They provide, protect and improve your professional life. Most of all, they open you up to new opportunities to connect, be inspired, and share your passion and talent with the world.

Stay tuned @

<http://www.sname.org/UniversityofHawaiiStudentSection/Home/>

<http://www.sname.org/home>, <http://www.mtsociety.org/>

Final Page

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Masoud, Professor Ertekin and Jerica at graduation.



Hana O Ke Kai

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**ENGINEERING THE
 OCEANS SINCE 1966!**