ORE since 1966
OCEAN AND RESOURCES ENGINEERING
IN THE SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY AT THE UNIVERSITY OF HAWAI'I AT MĀNOA

HANA O KE KAI "Work of the Ocean"

NEWSLETTER OF THE OCEAN AND RESOURCES ENGINEERING DEPARTMENT, Fall 2010, Volume 11, Issue 1

Chair's Message

Bruce M. Howe, Chair

As I take on the job of department chair, I want to thank John Wiltshire for his leadership of ORE over the past three years. He not only brought the department through the ABET accreditation process with flying colors, but he also nearly doubled the size of the department with Professors Nosal and Nihous, and me. John will continue to serve the department as Associate Chair and Geno Pawlak will serve as Graduate Chair.

Since last spring's newsletter, the following students have graduated with an MS: Troy Heitman (continuing for PhD with Prof. Cheung), Nicholas Pisciotto (Engineer with private sector), Victoria Vaganov and Randi Arinaga (trainee with Prof. Cheung). Krishnakumar Rajagopalan and Yoshiki Yamazaki obtained their PhD and are rounding out their tenure as post-doctoral researchers with Professors Nihous and Cheung. Congratulations to Yoshiki; he was awarded the ORE Outstanding Student Award for 2009/2010.

We welcome many new members to the ORE ohana. Ten new students have joined us and have interviews in this newsletter. New visiting scholars and trainees include Dr. Joongwoo Lee a UH/ORE alumnus coming from the Korea Maritime University; Juan David Osorio Cano a recent MS Hydraulic Resource graduate from the Universidad Nacional de Colombia, Medellin, and Chris Colgrove, trainee with Pawlak. Alyssa Glass is a new student helper for Pawlak.

Lora Van Uffelen has just joined us as an assistant researcher, working with Bruce Howe and Eva-Marie Nosal. She received her PhD in 2009 from the Scripps Institution of Oceanography, studying long-range acoustic propagation. She'll arrive in December, after participating in the PhilSea10 cruise in November.

We want to thank an anonymous donor who has contributed $20,000 to ORE via the UH Foundation. This gift will support our seminar series, student awards and other projects that will assist our students and faculty to achieve their academic and research goals.

Lastly, it was my pleasure to host a department start-of-semester party at my house. It was a wonderful time and a good chance for many of us to meet and get to know each other.

Inside this issue:

Photo of the issue: *ORE Ballerz, the dream team!*

"Shoot for the moon, even if you miss you will land among the stars."

Although **ORE Ballerz** did not gain the goal, to be the champion, they gained the title: **The best football team in the history of the ORE department.**

Independent Standings

Team	W-L-T	F/D	PTS-AVG	SR
1 Landsharks	6-1-0	0/0	0.86	3
2 ORE Ballerz	6-2-0	0/0	0.75	2.25
3 He Hate Me	5-3-0	0/0	0.62	4
4 lawless	5-3-0	0/0	0.62	2
5 Dougie	4-4-0	0/0	0.5	3
6 Bomb squad	3-4-0	0/0	0.43	3
7 Lightening Ninjas	2-4-0	2/0	0.33	2
8 Team Laser	2-6-0	0/0	0.25	2.62
9 Team Ramrod	1-7-0	0/0	0.12	2.62

Students' Voice

Masoud Hayatdavoodi, Student Representative

Once upon a time, there was a town which had hard working people and a king. The king had nothing to do but to live off the work and achievements of civilians. One day, completely out of the blue, the king decided to set a new rule: Whomever enters the town has to be touched with a hot stick. Staff were hired and trained to implement the rule. Seven days later, the king dressed as a normal civilian and went to the main gates of the town to see if the new rule was being followed and if there were any complaints. At the main gate, on a relatively hot afternoon, workers who spent the day in the fields outside of the town, were standing in line to get the hot stick on their body and enter. The king, in his civilian dress, asked one of the people in line "don't you have any complaint about the new rule?" The worker responded, "No, I just wish there were more staff and we could get the hot stick faster rather than standing in long lines."

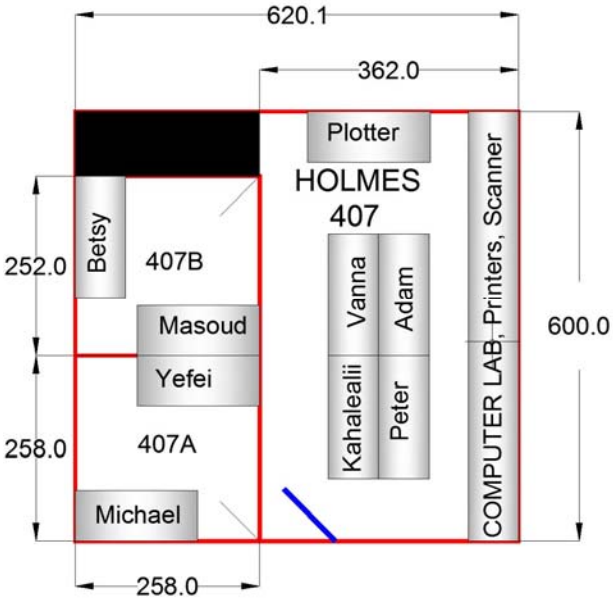


Fig. 1 Schematic view of room Holmes 407. Blue line shows the main door and dimensions are in centimeter.

There has been a good tradition in the department to provide office space and a desk for those students who need it. Ten new graduate students joined the ORE department in Fall 2010 creating another successful year for ORE in terms of the number of admitted students (we will learn more about some of them in this issue of the newsletter, pages 8 and 9). Prior to arrival of these new students, only one desk-space was available. Gradually, some more desks were provided by squeezing the number of students in each room, changing office set-ups and graduation of a few students. Whoever wanted to have desk, got a desk. This had a price: more crowded student offices. During the process some other issues also arose, such as hesitation among some of the existing students in welcoming the new students into their already tiny spaces.

To give a sense about the current situation, let us look at some numbers. A schematic view of one of the ORE offices, Holmes 407, is shown in Fig. 1. The area of each of the small rooms in this office is about 6.5 square meters and accommodates two Ph.D. students. In other words, about 3.25 square meters per student. Now, let us assume that the student has a regular size office desk (about 1.4 square meters), a small library shelf and/or maybe a cabinet. Subtracting the occupied space leaves only about 1.25 square meters of floor space per student.

A smaller office space and more crowded conditions does not only make for unpleasant working environment for the students, but it also affects their efficiency. Conversations inside offices have to be kept to a minimum, in consideration of others. Friendly-working environment will gradually become serious and tense, an atmosphere where students will have less and less passion to be at. As a result, solutions such as working in night shift or working at home will be developed. None of these creates an ideal or even acceptable situation for collaborative learning.

Space issue is not a new problem in the ORE department. In Fall 2007 a new room was added to the available space, which made a difference. However, nothing has changed and the number of the students has continued to grow. The response that some of the other University of Hawaii departments also have the same problem does not justify or relieve the issue. Solutions such as squeezing more students, providing temporary offices or renewing the current space may seem like some relief in the short term, but is actually no better than increasing the number of staff in the above story about the town. Most of our students spend more than 50% of their total time in the offices for 2 to 6 years. They deserve a better situation. Having a common dining room or a get-together room for students seems more like a dream than reality. This would provide a necessary interaction space, which would produce a stronger student body, especially in light of the restrictive office space.

At this point, although it is not the only problem in the department, the student office issue is a major one that warrants continued attention by the administration.

Live Happily!

Publications and Events

Some Recent ORE Publications

Roeber, V., Y. Yamazaki and **K.F. Cheung**, "Resonance and impact of the 2009 Samoa tsunami around Tutuila, American Samoa", *Geophysical Research Letters*, 37(21), L21604, Doi: 10.1029/2010GL044419, 2010.

Kim, J.W., **R.C. Ertekin** and K.J. Bai, "Linear and Nonlinear Wave Models based on Hamilton's Principle and Stream Function Theory: CMSE and IGN," *J. Offshore Mechanics and Arctic Engineering,* Trans. of ASME, Vol. 132, May, pp. 021102-1-021102-6, SOEST No. 7478, 2010.

Howe, B.M., Y. Chao, P. Arabshahi, S. Roy, T. McGinnis, and A. Gray, A Smart Sensor Web for Ocean Observation: Fixed and Mobile Platforms, Integrated Acoustics, Satellites and Predictive Modeling, Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of, V. PP, I. 99, pp 1-15, doi: 10.1109/JSTARS.2010.2052022, 2010.

Nihous, G.C., "Mapping available Ocean Thermal Energy Conversion resources around the main Hawaiian Islands with state-of-the-art tools," *Journal of Renewable and Sustainable Energy*, 2, 043104, doi:10.1063/1.3463051, 9 p., 2010.

Nihous, G.C., "Notes on the temperature dependence of carbon isotope fractionation by aerobic CH4 oxydizing bacteria," *Isotopes in Environmental and Health Studies*, 46(2), 133-140, 2010.

Nihous, G.C., "A Combinatorial Proof of a Novel Binomial Identity," *The Mathematical Scientist*, 35, 54-56, 2010.

Nihous, G.C., K. Kuroda, J.R. Lobos-González, R.J. Kurasaki, and S.M. Masutani, "An analysis of gas hydrate dissociation in the presence of thermodynamic inhibitors," *Chemical Engineering Science*, 65, 1748-1761, 2010.

Yoza, B.A., **G.C. Nihous**, T.K. Takahashi, L.G. Golmen, J.C. War, K. Otsuka, K. Ouchi, and S.M. Masutani, "Deep Ocean Water Resources in the 21st Century," *Marine Technology Society Journal*, 44(3), 80-87, 2010.

Sevadjian, J., M.A. McManus, **G. Pawlak**, "Effects of physical structure and processes on thin zooplankton layers in Mamala Bay, Hawai`i," *Marine Ecology Progress Series*, 409: 95-106, 2010.

Upcoming Meetings and Conferences

International Symposium on Underwater Technology 2011 & International Workshop on Scientific Use of Submarine Cables and Related Technologies, Tokyo, Japan, 5-8 April, 2011
http://seasat.iis.u-tokyo.ac.jp/UT11_SSC11/index.html

30th International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2011), Rotterdam, The Netherlands, June 19-24, 2011
http://www.asmeconferences.org/OMAE2011/

The 21st International Offshore (Ocean) and Polar Engineering Conference (ISOPE-2010), Maui, Hawaii, USA, June 19-24, 2011
http://www.isope2011.org/

4th International Conference and Exhibition on Underwater Acoustic Measurements, Kos island, Greece, June 20-24, 2011
http://www.uam-conferences.org/index.php/overview

2011 Conference on Coastal Engineering Practice: Engineering Sustainable Coastal Development, San Diego, California, USA, August 21-24, 2011
http://content.asce.org/conferences/copricoastal2011/

OCEANS '11 MTS/IEEE Kona, Kona, Hawai`i, Sept 19-22, 2011
http://www.oceans11mtsieeekona.org/

Inside ORE

Ocean Thermal Energy Conversion (OTEC)

Gérard C. Nihous

We are all familiar with the warm waters surrounding the Hawaiian Islands year round. Many of us, as well as countless tourists have long enjoyed this fact, the cause of which seems simple enough: the upper layer of tropical oceans stores some of the abundant solar energy it receives. The fact that deep seawater is chilly in the Tropics is far less intuitive. It was discovered in 1751 by the captain of an English slave-trading ship, Henry Ellis, with some sort of 'bucket sea-gauge'; as a result, the captain reported enjoying cold baths and chilled wines in the torrid climate off the African coast. The polar origin of deep cold seawater worldwide was correctly identified by another Englishman, Count Rumford, in 1797. This mechanism is a feature of a planetary-scale flow of oceanic water masses known as the thermohaline circulation (THC) to modern oceanographers.

The existence of sharp temperature differences through the water column of most tropical oceans later gave rise to the notion of Ocean Thermal Energy Conversion (OTEC). It was formulated by Arsène d'Arsonval as a mere concept in 1881, and first tested by Georges Claude along the Cuban coast in 1929. More modern research and development efforts in the 1980s and 1990s took place, for the most part in Hawaii. The engineering challenges associated with OTEC stem from the low temperature difference that 'fuels' the power plant's heat engine. Large components are required, including a large diameter pipeline extending to water depths of the order of one kilometer.

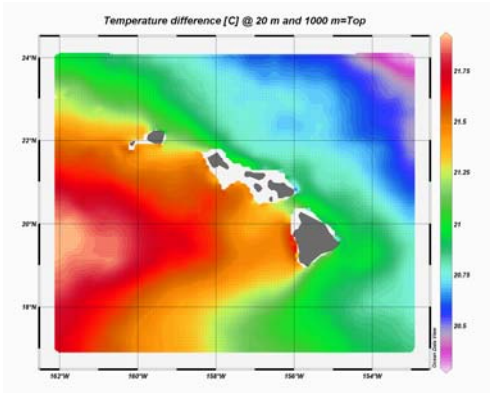
Aerial view of the largest experimental OTEC plant to date. It was built and operated at Keahole Point, Big Island of Hawaii, through the mid-1990s.

OTEC has unique attributes among renewable energy technologies. The fact that it does not rely on the capture of an energy *flux* promises spatially concentrated systems rather than widely spread arrays (in a relative sense). More importantly, OTEC has exceptional baseload capabilities, i.e. the ability to provide firm electrical power to a grid. This point is absolutely critical when considering the future energy portfolio of isolated islands.

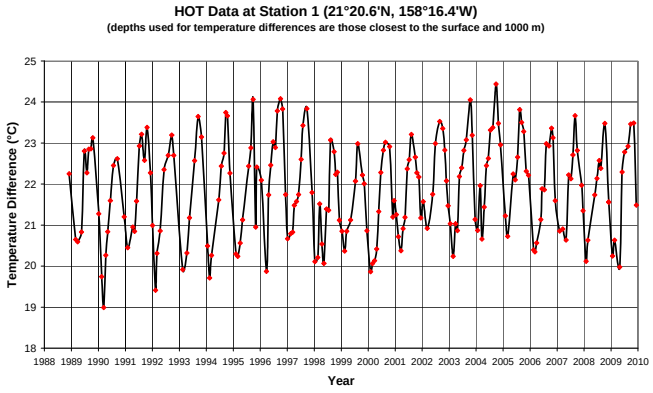
Interesting questions also arise regarding the potential environmental interactions between large OTEC systems and the ocean environment, as well as the size of global sustainable OTEC resources. At present, some of these issues have been (or will be) the research focus of two projects in the ORE department.

The first one is imbedded in the Hawaii National Marine Renewable Energy Center created in 2008 by the U.S. Department of Energy, and anchored at UH's Hawaii Natural Energy Institute (HNEI). The evaluation of global sustainable OTEC resources will be attempted using state-of-the-art ocean general circulation models (GCMs) such as MITgcm. Simple one-dimensional analyses of the water column have suggested that the strength of the THC likely represents a limit of the overall deep cold seawater flow rate that can be stably used by OTEC systems. This hypothesis essentially will be tested at a much higher modeling level.

The second project is funded by a grant from Lockheed Martin Corporation under their University Research Initiative. Using a GCM as well, it will examine the potential interactions of a large OTEC plant with its environment at a much smaller spatial scale in a highly-resolved background oceanic domain. The key features are two large seawater intakes, possibly of the order of hundreds of cubic meters per second, and the corresponding effluent, all located at different depths in the water column. The determination of flow characteristics should help design the seawater discharge efficiently, facilitate permitting, and provide a physical basis for the future evaluation of the so-called 'artificial upwelling' effect (a possible enhancement of the food chain).



A map of the OTEC thermal resource around the Hawaiian Islands (3-year averages of temperature differences between 20 m and 1000 m depths). While a leeward-windward asymmetry is apparent, the resource is excellent everywhere.



The baseload capabilities of OTEC is clear from temperatures differences off Kahe Point, Oahu measured for more than 20 years (Hawaii Ocean Time series program).

ORE Student Research

A PASSIVE ACOUSTIC DETECTOR FOR CENTRAL PACIFIC MINKE WHALE CALLS USING SPECTROGRAM CROSS-CORRELATION

Blue Eisen

The minke whale (*Balaenoptera acutorostrata*) is the smallest of the Balaenopteridae with an average length from 7 to 9.8 meters and average weight from 5 to 10 tons and are known to range from the arctic to the tropics but low-latitude sightings are rare, especially around the Hawaiian Islands as they tend to travel alone or in very small groups and have a notoriously inconspicuous blow making them difficult to spot. The "boing" sound first described by Wenz in 1964 has been shown to be from minke whales. Passive acoustic data indicate that minke whales are present around the Hawaiian Islands during winter and spring, possibly in significant numbers.

An automatic recognition program for minke whale boings would be a useful tool in the development of survey methodologies that study population distribution and behavior. Automated recognition programs have advantages over human listeners as they can be used to process large amounts of data with less effort. A minke whale boing detector based on the spectrogram correlation method described by Mellinger and Clark (2000) was developed and tested in this work. A template or kernel based on the analysis of existing recordings of minke whale boings recorded on bottom-mounted hydrophones at the Pacific Missile Range Facility was developed. The kernel value, k for a given time and frequency point is given by the second derivative of the Gaussian distribution where

$$k(t,f) = \left(1 - \frac{x^2}{\sigma^2}\right) e^{\left(\frac{-x^2}{2\sigma^2}\right)} .$$

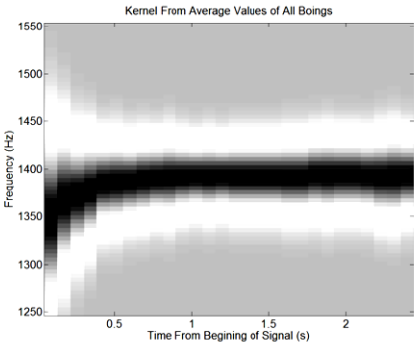


Figure 1. Kernel for Minke whale boings developed from recordings taken at PMRF. Dark areas represent positive values, light areas represent negative values and gray is zero.

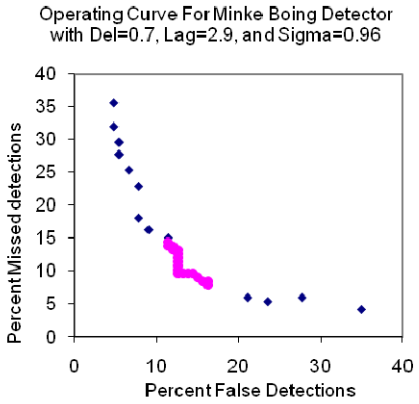


Figure 2. Final operating curve for minke boing detector. Blue points represent threshold values ranging from 20 to 400 in increments of 20. Red points represent threshold values ranging from 176 to 236 in increments of 1.

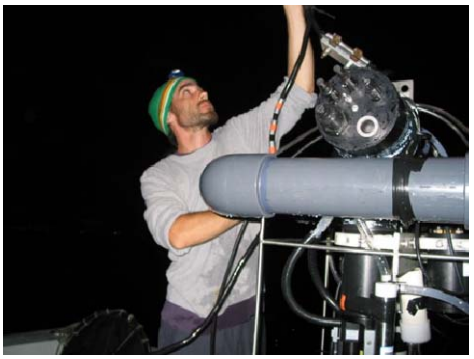
The bandwidth of the kernel, as defined by sigma (s), can be adjusted to optimize the detector based on the amount of variation in the boings being detected. In order to detect the sound in a recording, a spectrogram of the recording is made and cross-correlated with the kernel representing the characteristic sound. The cross correlation produces a correlation value which indicates the likeness of the recorded sound to the kernel as a function of time. Higher values of the correlation or recognition function indicate a higher probability that the sound of interest is in the recording.

The kernel, shown in Figure 1, was cross-correlated with additional recordings from the ALOHA Proof Module containing minke whale calls that have been manually identified by a human observer in order to quantify and tune detector performance. The boing detector has four input parameters; sigma controls the bandwidth of the kernel, del defines the minimum size of a peak that is identified, lag sets the minimum time between detections, and threshold defines the minimum magnitude of a peak that has satisfied both del and lag which is recorded as a detection. Two errors are possible, if a boing is present in the data but not identified by the detector it is a missed detection and if a boing is detected that does not exist in the data it is a false detection. It was found that with sigma=0.96, lag=2.9 s, del=0.7, and threshold=206 the detector misses 9.639% of the manually identified signals and provides 12.651% false detections. Figure 2 shows the final operating curve for the minke boing detector.

ORE Staff Introduction

Brian McLaughlin is an Oceanographic Research Specialist with 14 years experience in coastal and open ocean research at UC Santa Cruz and University of Hawaii, and earlier as a graduate student of Stony Brook University.

Brian contributes to studies concerned with physical-biological interactions between hydrologic structure and marine organisms, and to the development of instrumentation and techniques necessary to make fine-scale *in situ* measurements. Brian's primary ORE responsibilities are the design, testing and maintenance of backbone infrastructure and instrumentation at the Kilo Nalu Nearshore Reef Observatory under the direction of the observatory Director, Dr. Geno Pawlak, as well as the development of a distributed data acquisition system for ocean observatories.



Alumni

In this issue of the newsletter, we are featuring five of the recently graduated ORE students. Some of them chose ORE as the next step which you will learn about it. They all were asked same following questions.

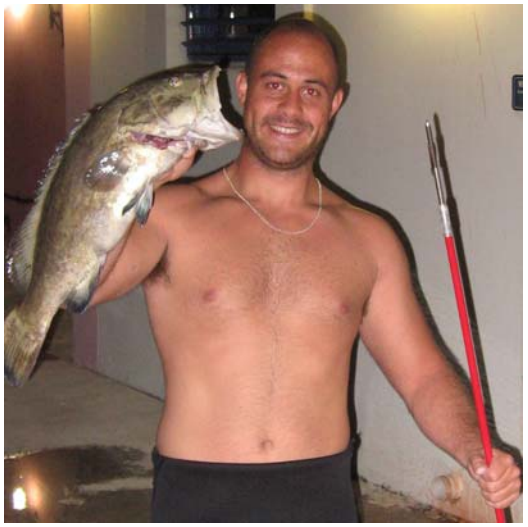
Questions:

1. Name?
2. Admission year?
3. Graduation Date?
4. Graduation level (MSc. or PhD)?
5. Advisor?
6. Thesis/Dissertation title?
7. City and Country that you live in now?
8. One thing that you liked the most about ORE?
9. One thing that you would change in ORE?
10. A short description about your current professional life?
11. Something about your current personal life that you would like to share with others?
12. A message to the current ORE students, faculty and staff?

1. Krishnakumar Rajagopalan

2. 2002, August
3. 2010, August
4. PhD
5. Professor Geno Pawlak
6. Large Eddy Simulation of Turbulent Boundary Layers Over Rough Bathymetry
7. Honolulu, USA
8. Excellent Faculty
9.
10. I am currently working as a post doctoral researcher with Dr. Nihous in the National Marine Renewable Energy Center at the University of Hawaii. The center is tasked with facilitating the commercialization of wave energy and OTEC systems. My responsibilities include numerical modeling of the ocean circulation using MITgcm to study the effects of OTEC systems on global heat flux.
11. Spending more quality time with my wife and son
12. A great place to get rigorous training in ocean engineering/ Fluid mechanics

1. Troy Heitmann



2. Fall 2007
3. Spring 2010
4. MSc
5. Dr. Cheung
6. Morphodynamic classification of beaches in tropical environments
7. Honolulu, HI
8. The size of the program allows for interactive learning between students and professors. As a result, friendships grow making the work environment more appealing.
9. I would unify the program in terms of office/lab location. Bringing everyone together not only improves the social and educational wellbeing of the program, it also makes for better marketing to perspective students, researchers, and funding agencies. There is a lot of potential hindered by the individualism….strength in unity!!
10. I was recently admitted to the PhD program and plan to take the qualifying exam in the spring. In the mean time, I'm continuing research on coastal processes and laying the foundation for my dissertation work.
11. Ha…I won't go into any details, but I will say that a proper balance between your work and personal life is a must or else you'll go crazy!! It also helps being in Hawaii, what I like to think of as one of nature's greatest playgrounds.
12. I would just thank everyone for making my overall experience a positive one. I've been in school for a long time, and I finally can say I love what I'm doing and I believe a lot of credit is to be given to the individuals within the program.

Alumni

1. Randi Aulii Akime Arinaga

2. Fall 2003
3. Summer 2010
4. MSc. (Ocean Resources Option)
5. Dr. Kwok Fai Cheung
6. Global Wind And Wave Atlas From Ten Years Of Final Tropospheric Analysis And Hindcast Wavewatch Iii Data
7. Honolulu, Hawaii
8. The people, I thank and wish you all the best.
9. More field research opportunities! I was able to go on a week long research cruise on the Kilo Moana, it was great!
10. At the moment I'm still doing wave energy research at UH, and am looking forward to moving back to Kauai in the near future.
11. I'm planning a wedding, and training for my first marathon!
12. Enjoy!!!

1. Victoria Vaganov

2. Fall 2007
3. Spring 2010
4. MSc
5. Alex Malahoff, Kwok Fai Cheung, John Wiltshire, and Gerard Nihous. All of those mentioned were a great help to me during my masters studies in the ORE department at UH, and I would like to take this opportunity to thank them all. Thank you!
6. Utilizing Tidal Current Power in Cook Strait, New Zealand
7. Somewhere on the Pacific rim
8. The best thing about ORE is that its location allows for plenty of opportunities for observational studies of the ocean and its processes. This is a great benefit for its students.
9. If I could change one thing about the department I would add a field study course. The importance of field and laboratory studies seemed passed over by the department when I was a student there.
10. My professional life huh? Well I am still decompressing from the whole ORE experience so, my professional life is still pending. Next week I am taking the NCESS FE exam, and then I hope to entertain the idea of working towards a PhD.
11. Having graduated, and regained some time and energy previously committed towards studies, I have been focusing more on my music and writing. Last year my father gave me an electric bass and and electric guitar for Christmas. I enjoy playing guitar and I love writing short stories and poems. So, maybe I'll write a song one of these days.
12. I miss everyone at ORE! Aloha to all and I hope to see you all again next September for the Oceans conference in Kona.

1. Yoshiki Yamazaki

2. September 2004
3. August 2010
4. PhD
5. Prof. Kwok Fai Cheung
6. Depth-integrated, non-hydrostatic model with grid nesting for tsunami generation, propagation, and runup.
7. Honolulu
8.
9. I believe ORE provides amazing environment for numerical model and field studies. I wish we could have a wave tank to further extend our study field to physical experiment.
10. Tsunami and storm surge inundation numerical model development
11.
12.

New in ORE

Welcome to ORE. 10 new masters and Ph.D. students joined the department in Fall 2010. Below, we will learn more about 7 of them who responded to the following questions.

Questions:

1. Name
2. Level of study
3. Your academic background
4. Your research topic in the department
5. Your advisor
6. Where is your office?
7. Only after being here for a short time, what has attracted your attention about the program and the department the most?
8. Anything else you would like to share with others?

1. Mike Cynn
2. Ph.D
3. B.S., M.S., Civil and Environmental Engineering, Carnegie Mellon University
4. Boundary Layer Hydrodynamics
5. Geno Pawlak
6. Holmes 407A
7. The small group of talented faculty and students with lifelong dedication to ocean-related studies.
8. Not really.

1. Betsy Seiffert
2. Ph.D.
3. B.S. Mathematics - University of Iowa
M.Oc.E. Ocean Engineering - Oregon State University
4. Hydrodynamic loads on coastal bridges due to tsunami
5. Professor Ertekin
6. Holm 407B
7. 1) Everyone is very friendly and easy to get along with.
2) I got to go out on a boat Friday for a class.
8. I race triathlons - so if anyone knows of good runs, rides or especially open water swims, or if you want to join me, let me know!

1. Peter Anast
2. MS
3. BS in Mechanical Engineering, 28 years in Boeing Commercial Airplane design and manufacturing.
4. Ocean Energy
5. Dr. Nihous
6. Holmes 407
7. I really appreciate the passion for teaching from all the professors.
8. I am available to help and advise young engineers find their way.

1. Austin Barnes
2. M.Sc.
3. B.A. in Chemistry and Physics
4. Beach Morphology
5. Ben Brooks
6.
7. The people in the department are extremely qualified, dedicated, and overall great people. The close work between pure science and engineering in the department is also very exciting.
8.

New in ORE

1. Charlie Field
2. M.Sc.
3. B.Sc. Mechanical and Ocean Engineering, MIT.
4. Design and motion analysis of high-speed boats.
5. Dr. Cheung
6. MSB 318.
7. My favorite part of the ORE department so far has been the passion that all the professors and teachers have shown with regards to their research.
8. I love that so many people share my love of the ocean. I enjoy sailing in my free time and will take whatever opportunity I can to get out and enjoy the island.

1. Adam Miyamoto
2. MS
3. BS Biological Engineering, UH Manoa
4.
5. Dr. Nihous
6. Holmes 407
7.
8.

1. Kahalealii Muhlestein (Kahale)
2. M.Sc.
3. UH Manoa 2010, B.S. Civil Engineering
4. Coastal Engineering
5. Dr. Cheung
6. Holmes 407
7. Everyone's kindness.
8. I am glad to be here! I hope to get to know more of you later, it takes a while for me to get to know people by name.

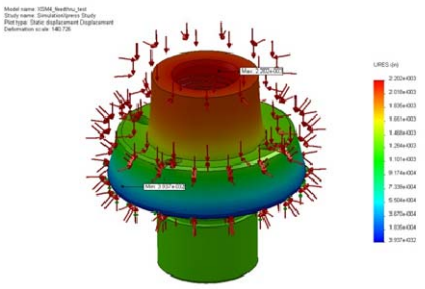
ORE Staff Introduction

Kimball S. Millikan, Sr. Marine Research Engineer, ORE

Kimball is a mechanical engineer with 23 years of mechanical design experience in oceanographic and coastal research. He earned his BS in Applied Mechanics from UCSD in 1990. He has contributed to numerous field deployments, observatories, and oceanographic studies both at Scripps Institution of Oceanography and the University of Hawaii.

Kimball joined the University of Hawaii staff in 1999. His responsibilities for the department broadly include mechanical design and development of oceanographic instrumentation and equipment, and coordinating and directing field operations. He is currently involved in the cabled observatories Kilo Nalu and Aloha projects including mechanical design and stress analysis of pressure housings, endcaps, instrument support frames, hybrid-fiber optic and power terminations, and high pressure electrical feed thru plugs in addition to field support and logistics for nearshore installations.

Kimball maintains the SOEST 27ft Kilo Kai research vessel and has logged over 950 research dives. He maintains a commercial pilot license providing scientists an inexpensive low altitude remote sensing platform. Previous aerial work includes air/sea interactions and radiation stress studies.



DESIGN ACCOMPLISHMENTS:
GPS tracked surf zone drifters, 8m tall bottom mounted tower for a vertical array of Acoustic Doppler Velocimeters, small boat flow through system for underway CT measurements, hybrid power/fiber-optic underwater cable terminations, motor-driven horizontal ADCP profiler frames, vertically adjustable frames for the surf zone environment, subsurface T-chain moorings, instrument brackets, various underwater pressure housings, end caps, plugs, and a wave-driven wiper for oxygen sensors.
In his free time, Kimball enjoys surfing, flying, playing congas and inspiring his two children to do the same.

Final Page

Your Gift to the ORE Enrichment Fund

THE ORE ENRICHMENT FUND
(The University of Hawaii Foundation
Account # 123-7310-4)

Yes, I'll support

My gift* is:

□ $10,000 □ $5,000 □ $3,000

□ $1,000 □ $500 □ $300

□ $100 □ $50 □ $_____

□ My check is enclosed payable to:
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□ A matching gift program is offered through my (or my spouse's) employer, _____(form enclosed)

□ The gift is in memory/honor of _____

Name(s): _____

Address: _____

_____

E-mail: _____

□ Please do not include my name in the ORE Enrichment Fund Donor Report (I would like to be an anonymous donor).

Please mail your check and this form to: c/o ORE Enrichment Fund Administrator, Department of Ocean and Resources Engineering, University of Hawaii at Manoa, 2540 Dole Street, Holmes Hall 402, Honolulu, HI 96822, USA
Eml: *adminore@hawaii.edu,* ***Tel:*** *+1 (808) 956-7572,* ***Fax:*** *+1 (808) 956-3498*

ORE Student Calendar Fall2010-Spring2011

No	Activity	Semester	Coordinator
1	Intramural Sport Activities	Fall-Spring	Patrick Anderson and Charlie Field
2	Hiking	Fall	Kai Gemba
3	Hiking	Spring	Vanna Keller and Matt Morita
4	Department BBQ	Dec. 2010	Patrick Anderson and Kai Gemba
5	Department BBQ	Feb. 2011	Masoud Hayatdavoodi
6	Department BBQ	May 2011	Vanna Keller
7	Student Meeting	Spring	Masoud Hayatdavoodi

Congratulations to Professor **Brian Bingham**, ORE cooperating faculty, on recognition as a top young engineering educator by the National Academy of Engineering. Learn more about this excellent award at http://www.hawaii.edu/news/article.php?aId=3980

Hana O Ke Kai
Newsletter of the
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School of Ocean and Earth Science and Technology
University if Hawaii at Manoa

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ENGINEERING THE OCEANS SINCE 1966!