

INSIDE THIS ISSUE:

STUDENTS' VOICE	2
PROJECT NEWS—Tsunami Research	2
NEW SOEST DEAN	3-4
NEW ORE COURSE	4
GRADUATES OF ORE	5
MEETING CALENDAR	5
PROJECT NEWS—HURL	6-7
ORE ENRICHMENT FUND GIFT FORM	7
NEW FACES ORE	8
PUBLICATIONS	8
INSIDE ORE: WHO'S WHO	9
ORE WEB SITE	10
EDITOR'S NOTE BOOK	10

Chair's Message

Welcome to the Ocean and Resources Engineering newsletter *Hana O Ke Kai*. This year marks the fortieth anniversary of our program at the University of Hawaii. Back in 1966, Prof. Charles Bretschneider established one of the first ocean engineering programs in the United States. To date, we have graduated 194 MS and 51 PhD students originated from more than 20 countries. Many of them have found successful and rewarding careers in ocean-related engineering fields.

The faculty and program have evolved over the years. Prof. Jannette Frandsen is the latest addition to the faculty. She received her PhD from Cambridge University and taught at Oxford University and Louisiana State University prior to joining us in Spring 2006. Prof. Frandsen is a recipient of the prestigious NSF CAREER award and her expertise has added structural engineering, aerodynamics, and computational fluid dynamics to the Department's research portfolio.

She has kindly agreed to be the editor of this newsletter, which is our main venue to communicate the latest development in the Department with our alumni. We would also like to hear the latest from you. Feel free to email me at cheung@hawaii.edu or our newsletter editor at frandsen@hawaii.edu.



-Kwok Fai Cheung

● Announcements ● Honors & Awards ● Student Fellowships ●

Editorial positions:

Dr. J. Wiltshire has been appointed *Editor* of the international peer reviewed journal: [Marine Georesources & Geotechnology](#).

Prof. Ertekin has been appointed as *Editor-in-Chief of the Ocean Engineering journal of Elsevier* effective October 1, 2006. He will share the duties of this position with Prof. A. Incecik who is the Head of School of Marine Science and Technology at the University of Newcastle upon Tyne. Prof. Ertekin is also currently serving on the Editorial Boards of the *Journal of Marine Science and Technology*, Springer Verlag; *Marine Structures* journal, Elsevier; *Applied Ocean Research* journal, Elsevier; *Journal of Engineering for the Maritime Environment*, IMechM, PE Publishing; and *Journal of Waterway, Port, Coastal & Ocean Engineering*, ASCE. He also served as an Associate Editor of the *J. Offshore Mechanics and Arctic Engineering*, Transactions of ASME, from 1992-1999.



Student Fellowship:

Marion Bandet-Chavanne, Ph.D. candidate has been awarded a prestigious [Link Foundation Doctoral Research Fellowship](#) in Ocean Engrg. and Instrumentation for 2006–2007. The fellowships are given out to the nation's top ocean engrg. students. The goals of the Link fellowships are: to

“Congratulations!”

foster ocean engrg. and ocean instrumentation research; to enhance both the theoretical and practical knowledge and applications of ocean engrg. and instrumentation research. The principal objective of Marion's research is to investigate the interaction between bottom roughness, flow structure and turbulent properties within the wave-current boundary layer, and particularly to examine the spatial variability of turbulent properties over irregular roughness. This research is based on field observations that have been carried out within the [Kilo Nalu Observatory](#) under the direction of Prof. Pawlak.



The focus for Marion's project is on relating wave energy dissipation or friction factor estimates to physical

roughness elements and on understanding the dynamics of the near-bed turbulent flow processes.

Conferences:

OMAE 2009 Meeting

Prof. Ertekin & Riggs, Chair, Dept. of Civil Engrg. are to host the **International Conference on Offshore Mechanics and Arctic Engineering** in Honolulu, Hawaii.

Students' Voice

Aloha! From all the ORE students, I'd like to give a warm welcome to our new students and scholars: Pablo Duarte-Quiroga, Masoud Hayatdavoodi, Lei Yan and Simon Mortensen. We've enjoyed getting to know all of them, and hope they enjoy their stay in Hawai'i. There will soon be another addition to the ocean engineering and oceanography world, Marion Bandet Chavanne and her husband Cedric Chavanne are expecting their first child December 18, and we would like to send them early congratulations.

I'm happy to be able to announce the engagement of Sophie Munger and Alejandro Sánchez. They got engaged on Maui over the Labor Day weekend, and we wish them all the best. Another congratulation goes out to Alejandro for successfully defending his thesis this fall on "Tsunami Forecast using an Adaptive Inverse Algorithm for the Peru-Chile Source Region".

Several students have gotten together and decided to run the Honolulu Marathon this December. Look forward to some great finish line pictures of Randi Arinaga, Abdulla Mohamed, Sophie Munger, Yongyan Wu and myself. Feel free to come cheer us on!

In other news, we recently held a student forum where we had some very constructive input for life in the ORE department. We've decided to reinstate the tradition of having a barbeque or department party once a semester, which should be a good time for all.

On a side note, we'd like to share with you some observations of "The Hydrodynamics of Honolulu Traffic."

1. Laminar Flow: lane lines show us the laminar flow of Honolulu traffic. We see evidence of increasing Reynolds Number as rush hour drivers change lanes.

2. Boundary Layer: we can see the effects of how viscosity plays a role to slow the flow in the merge lane. Sometimes we can even see the no-slip boundary condition in these merge lanes.

3. Disturbances in the flow field: characterized by stalled cars and fender benders.

4. Hydraulic Jump: we can picture this when traffic is at a crawl and suddenly we are traveling at 55mph.

5. Can we ignore the compressibility term? Judging by the increasing number of cars

we keep adding to Honolulu's traffic, I'm going to say no.



A Hui Hou,
- Megan Crow,
Student Representative

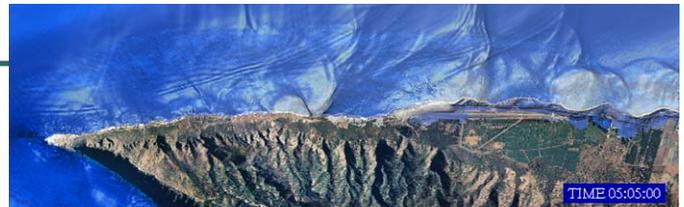
Project News: Tsunami Research

The Hawaiian Islands are vulnerable to tsunamis generated in the active subduction zones around the Pacific Rim. The Kuril earthquake on November 15, 2006 is the latest reminder. ORE has a long history of tsunami research with the notable work of Prof. Charles Bretschneider and Prof. Harold Loomis. The latest series of research projects started in 1999 with a contract from Hawaii State Civil Defense. The initial work, which was carried out in collaboration with the NOAA Pacific Tsunami Warning Center, developed an inverse algorithm to forecast far-field tsunami waveforms from near-field tsunami records. Subsequent collaboration with NOAA Pacific Marine Environmental Laboratory and the two NOAA tsunami warning centers resulted in the implementation of the inverse algorithm to provide tsunami forecasts in the Pacific Basin.

NOAA Sea Grant has been supporting basic and applied tsunami research in ORE since 2003. This has resulted in a fully conservative model for breaking and runup of long waves and the implementation of the inverse algorithm for tsunami inundation forecast. Sea Grant is also funding a pilot study to assess the vulnerability of Honolulu infrastructure to tsunamis. A probabilistic approach will take into account the uncertainties of earthquake parameters and

locations to determine the inundation as a function of return period. A new Sea Grant project will begin in February 2007 to investigate tsunami generation mechanisms and near-field characteristics. This topic coincides with a research priority identified in "the National Tsunami Research Plan" to be published in mid 2007.

The State of Hawaii began the effort to update the tsunami evacuation maps in January 2004. We play a key role in this multi-year project funded by Hawaii State Civil Defense and the National Tsunami Hazard Mitigation Program. The project utilizes latest modeling techniques, demographic data, bathymetry and topography, and Geographical Information System (GIS) technology. The 1475 km (915 miles) of coastlines of the six major Hawaiian Islands are divided into 28 segments. The effort began with Oahu North Shore segment, which has good runup records of major tsunamis during the last century. Reconstruction of these tsunamis using two-dimensional long-wave models and historical runup records determines the 100-year inundation limit and flow depth. This data provides the state and county civil defense agencies a reference for evacuation map update.



Our tsunami research activities are going to increase in the next few years. With funding from the National Science Foundation, we will perform a series of large-scale laboratory experiments at the Tsunami Wave Basin of Oregon State University in collaboration with UH Department of Civil and Environmental Engineering and Princeton University. The experiments will evaluate tsunami energy dissipation over fringing reefs, scour and liquefaction of foundation soils, and impact and uplift loads on structures. The California Department of Transportation will fund a joint study with Oregon State University to formulate a multi-year project to assess the vulnerability of its bridges to tsunamis. We will also participate in a project headed by the US Army Corps of Engineers in collaboration with the University of Southern California and Northwestern University to develop tsunami inundation and evacuation maps for the Mariana Islands.

-Kwok Fai Cheung

New SOEST Dean

SOEST has a new Dean, Prof. Brian Taylor, since July 1, 2007. ORE welcomes Prof. Taylor and looks forward to working with him. This article excerpts his comments made at the Chancellor's welcoming reception.

My goal as Dean is to continue building an innovative faculty, supported by excellent facilities and motivated staff, that will fulfill our potential and result in our shared success.

SOEST has grown to about 870 employees, including 240 Ph.D.'s, 450 staff, and 180 graduate assistants. The School is an international leader in such diverse fields as Alternate Energy, Tropical Meteorology, Coral Reef Ecosystems, Hyperspectral Remote Sensing, Volcanology, Seafloor Processes, Cosmochemistry, Marine Microbiology, Coastal Oceanography and Climate Modeling – and that is just the top ten!

Last year SOEST had a total budget of \$97M, three quarters of which was from extramural sources. The Schools extramural funding has tripled since its founding and accounts for 30% of the overhead generated at UH Manoa. SOEST offers a world-class undergraduate and graduate experience, enabled by state-of-the-art instrumentation and facilities, coupled with mentoring by leading researchers and educators. Four of those, Milton Garces, Andy Harris, Scott Rowland and Chip Fletcher, were honored at the recent UH Convocation with Excellence in Teaching, Research and Service awards.

SOEST's faculty have formulated strategic plans to address priority issues that have enormous societal relevance and immediate opportunities for implementation. The five priority areas are ocean observing, space flight, alternative energy, living marine resources, and natural hazards. Partnerships are key to their implementation.

Our first priority is to establish the Pacific Integrated Ocean Observing System (PACIOOS), which will include Hawaii and the US-Flag and US-Affiliated Pacific Islands. This partnership of federal and state agencies with academic, business and private entities, will implement a set of regional ocean observing systems



to assess and predict the effects of weather, climate and human activities on the state of the coastal ocean, on its ecosystems

and living resources, and on the island economies. I co-chair with Eileen Shea from the East-West Center the pilot program funded by NOAA to establish PACIOOS. Additional positions to support this endeavor are part of SOEST's biennial budget request. The vision is to provide an operational oceanographic service to the State to ensure a safe, productive and clean coastal ocean. Catalyst projects will define and forecast sea-state (that is, currents, waves, storm surge, flooding and beach erosion), enhance stewardship of living marine resources (the fisheries, coral reefs, and marine mammals), and develop a system of automated real-time monitoring of coastal water quality (both its chemistry and microbiology).

The second project is a joint venture with the College of Engineering to form the Hawaii Space Flight Lab. It promises, within 4 years, to have the University of Hawaii join only a handful of other NATIONS capable of launching satellites into space. With federally appropriated funds and the collaboration of industrial partners such as BAE Spectral Solutions/SurreySat, government labs such as Sandia and JPL, together with the Pacific Missile Range Facility on Kauai, we plan to launch micro-satellites into low Earth orbits for a fraction of the cost currently charged by NASA. Even so, the instrument development and first two launches will cost \$40M. Using a rail-launch facility at PMRF and spin-stabilized solid-fuel rockets, the Hawaii Space Flight Lab will break the current log-jam of getting small satellites weighing 30-300 kg into Earth orbits at 300-1100 km distance. Not only will this be an amazing high-tech workforce and economic engine for Kauai and Hawaii, but

it will provide unparalleled opportunities for faculty- and student-built microsatellite systems to get into space. One such system developed at SOEST and, before the Columbia shuttle disaster, slated for deployment on the Space Station, is a Hyperspectral Imager of the Coastal Ocean. It can be used, for example, to monitor the global distribution and health of shallow coral reefs.

The third area of priority research, engineering development and training is in developing alternative energy sources. The cost of energy in Hawaii makes this a natural place for the accelerated development of globally exportable technologies to reduce our dependence on imported oil. Several of these partnerships are already in place. One is the Hawaii Fuel Cell Test Facility, operated by HNEI together with Hawaiian Electric. This is

part of the Hawaii Energy and Environmental Technology initiative, funded by ONR, that also includes the assessment of methane hydrates as a potential future energy source. Another is the biomass gasification and flash carbonization projects that have several industrial partners. A third is the fabrication of thin-film semi-conductors for solar hydrogen production and solar photovoltaic systems. A

faculty partnership has submitted a \$17M proposal to Shell Oil to build a demonstration facility that generates biodiesel by feeding CO₂ to marine algae. Reducing UH's energy bill is also a priority issue for the Manoa campus, as my fellow Dean's know who have just received their annual budget allocations. To that end there was an Energy Summit here on October 24th led by Steve Meder from Architecture and Gordon Grau from Sea Grant, who have formed another partnership: The Center for Smart Building and Community Design.

The fourth SOEST priority relates to marine ecosystems. Understanding the biology, ecology and biogeochemistry of marine microorganisms, which are the base of the multi-cellular food chain, is the focus of the C-MORE Science and Technology Center, previously mentioned. Novel methods in molecular biol-

"SOEST five priority areas:

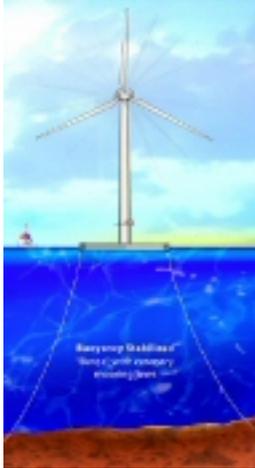
- (1) Ocean Observing,**
- (2) Space Flight,**
- (3) Alternative Energy,**
- (4) Living marine resources,**
- (5) Natural Hazards.**

New ORE Course: Renewable Energy

www.ore.hawaii.edu/OE/ore_courses.htm

In Spring 2007, a new course will be offered on the topic of :

Renewable Energy.



The course shall focus on predictions of energy generation from wind and wave absorbers. We shall learn about analytical and numerical approaches. The applications of interest include fixed and floating absorbers.

A tentative course outline is listed below.

"ORE 791 Course outline:

- ◆ ***Theory of vibrations of structures;***
- ◆ ***Wind & Wave loading;***
- ◆ ***Fluid-structure interactions;***
- ◆ ***Structural response;***
- ◆ ***Analytical & Numerical predictions;***
- ◆ ***Applications;***
- ◆ ***Project.***

This elective course should be of interest to students who have an interest in structural analysis & design; general fluid dynamics processes with/without free-surface and fluid-structure interaction modeling.

Should you wish to have more information before registration, please, contact Prof. Frandsen and/or email:

frandsen@hawaii.edu



Dean's message (Cont'd)

www.soest.hawaii.edu

ogy, combined with satellite- and sea-based remote sensing technologies, will link microbial process studies at spatial scales ranging from genes to entire Pacific Ocean. At the Hawaii Institute of Marine Biology we have multiple programs related to the health and vitality of tropical coral reefs – from gene flow, to community structure, to dispersal patterns. In partnership with NOAA, HIMB is the “brain trust” for improving stewardship of the NW Hawaiian Islands National Monument, as well as for understanding the foraging patterns of top predators such as tuna and sharks. HIMB researchers also study the sensory and perceptual processes of marine mammals. Human-induced ocean noise has become an increasingly contentious issue; witness the initial hold-up of parts of the Navy’s Rim-Pac exercises. Our scientists are seeking to inform that debate with hard-to-obtain data on the echolocation capabilities of whales and dolphins. Although there is a well-established graduate field of study in Marine Biology, some may be surprised to learn that UH does not offer it as a graduate degree. Working with the College of Natural Sciences and the Fac-

ulty Senate, I hope that we can soon rectify that.

The fifth focus area concerns natural hazards: earthquakes, tsunami, volcanic eruptions, hurricanes, storm surge and flooding. Our G&G and ORE faculty are working with the State, City and County to prepare better tsunami inundation maps and to implement Oahu Beach Hazard ratings predicted from offshore wave buoy data. We are working on all aspects of volcanic eruption processes. Partnering with the Japanese Marine Science and Technology Agency, faculty and researchers in the Department of Meteorology and the IPRC are improving our understanding of the Asian monsoon (which affects the lives of half the world’s population), and of tropical cyclones and thunderstorms. This fall we celebrated the 50th anniversary of Meteorology at UH. Despite outstanding advances in the last decades to forecast weather 5 days in advance and to predict hurricane tracks, we still face fundamental limitations on our ability to forecast hurricane intensity and risk. Roger Lukas in Oceanography together with Greg Holland from the National Center for Atmospheric Re-

search are proposing a national 5-year \$50M initiative to improve hurricane intensity forecasts and impact projections. This will involve many Federal and State agencies together with Industrial Partners such as the Oil Companies whose offshore rigs in the Gulf of Mexico would become instrumented platforms.

These are some of the key areas in which we are taking up the challenge to fulfill the four-fold vision of the School, which is to:

- ◆ Advance understanding of the Ocean, Earth & Planets;
- ◆ Provide world class education;
- ◆ Promote sustainable use of the environment;
- ◆ Foster a high-tech economy.

Mahalo to the administration, faculty and staff for the trust put in me to lead this wonderful enterprise that is the School of Ocean and Earth Science and Technology.

-Brian Taylor

Graduates of the Department

(Summer 2004– Spring 2006)

MS graduates (Plan A)			
Date	Name	Thesis Title	Advisor
Aug. 2004	Yamazaki, Yoshiki	<i>Forecast of Tsunamis From the Japan-Kuril-Kamchatka Source Region</i>	Prof. Cheung
Aug. 2005	Nunes, Vasco	<i>Survey and Statistical Parameterization of Bed Roughness of a Coral Reef</i>	Prof. Pawlak
Aug. 2005	Crabtree, Robert	<i>Hindcast Modeling of Storm Surge and Waves in the Gulf Coast Region</i>	Prof. Cheung
Aug. 2005	Hansen, Demont	<i>Implementation of a virtual Buoy Network For the Island of Oahu Utilizing Nested Third Generation Wind Wave Models</i>	Prof. Cheung
Dec. 2005	Merritt, Daniel	<i>Botcam-Design, Testing, and Development of a Fully Automated Stereo- Video Bottom Camera Bait Station for Ecosystem of Bottom Fish Species</i>	Dr. Wiltshire
Dec. 2005	Carter, Richard	<i>Wave Energy Converter Situated Beneath the Waves</i>	Prof. Ertekin
Dec. 2005	Wycklendt, Andrew	<i>Evaluation of a Coastal Ocean Model for Oahu, Hawai'i</i>	Prof. Cheung
Aug. 2006	Looney, Chris	<i>Investigation of the Use of Alphaflex® / High Density Polyethylene Composites as suitable Materials for Large Diameter Deep Ocean Cold Water Pipes</i>	Prof. Krock
MS graduates (Plan B)			
Date	Name	Project Title	Advisor
Aug. 2004	Yang, Jinghai	<i>Time Domain, Nonlinear Theories on Ship Motions</i>	Prof. Ertekin
May 2005	Cheifet, Jordan	<i>Durability, Repair, and Service Life of Concrete in Marine Environments</i>	Prof. Cheung
May 2005	Kincaid, James I.	<i>Identification of the Sand Island Sewage Outfall Plume Off the Southern Shore of Oahu Using CTD Casts</i>	Prof. Krock
Aug. 2006	Long, Chen	<i>An Efficient Parallel Scheme And its Applications in CFD Problems</i>	Prof. Cheung
Aug. 2006	Higa, Scott	<i>Feasibility Study of Seawater Air Conditioning In California</i>	Dr. Rezachek
PhD graduates			
Date	Name	Dissertation Title	Advisor
Aug. 2004	Tang, Liujuan	<i>Cylindrical Liquid-Liquid Jet Instability</i>	Dr. Masutani
May 2006	Wei, Yong	<i>Tsunami Runup Model and Forecast</i>	Prof. Cheung
May 2006	Xia, Dingwu	<i>Linear and Nonlinear Hydroelasticity of Mat-type very Large Floating Structures: The Green-Naghdi Theory</i>	Prof. Ertekin

Meetings Calendar 2007

Conference	Location	Date	URL
22nd Intl. Workshop on Water Waves & Floating Bodies	Croatia	15-18 April	www.fsb.hr/iwwwfb22
24th Intl. Conf. on Offshore Mech. & Arctic Engrg.	San Diego, USA	10-15 June	asmeconferences.org/OMAED7
17th Intl. Offshore & Polar Engrg. Conf. & Exhibition	Lisbon, Portugal	1-6 July	isope.org
12 Intl. Conference on Wind Engineering	Cairns, Australia	1-5 Oct.	http://www.awes.org/icwe12/
4th Intl. Mesoscopic meeting	Hamburg, Germany	24-28 July	http://www.icmmes.org/
10th Intl. Symp. on Practical Design of Ships & Other Floating Structures	Houston, USA	1-5 Oct.	PRADS2007.us
60th American Physical Society, Fluids Division meeting	Salt Lake City, UT, USA	18-20 Nov.	http://www.aps.org/units/dfd/
AGU	San Francisco, USA	Dec.	http://www.agu.org/

The Hawaii Undersea Research Lab. (HURL)



We shall learn more about future programs and oceanographic instrumentation testing and development, as reported by Dr. John Wiltshire.....

Closely associated with the ORE option area in ocean resources engineering program is HURL. HURL is essentially expedition oriented, and has a team of 18 investigators. HURL is one of six national laboratories in NOAA's Undersea Research Program. Each of these laboratories specializes in a different area of deep sea science and engineering. In the case of HURL, we operate two deep diving submersibles and an ROV. The submersibles Pisces IV and V are very special in that they are of modular construction. This means that they are based around an oil filled frame on which components can be hung. This has allowed a continuous upgrading of the submersible's instrumentation and the provision of a major platform for instrument testing and development.

"2005 five month South Pacific Cruise: record number of dives"

HURL works on the basis of major expeditions.

HURL recently completed a five month expedition to the volcanoes north of New Zealand and to the coral reefs of the American Flag Pacific Islands. For 2007-08 we are planning a major expedition to the Northwest Hawaiian Islands, the U.S. West Coast and Alaska. These expeditions utilize the R/V Ka'imikai-o-Kanaloa and the manned submersibles Pisces IV and Pisces V. The submersibles have 3-person capacity and 2000m depth capability.



Typical Ocean Resources Themes

The Northwestern Hawaiian Islands and Emperor Seamounts form an extensive submarine mountain chain that diagonally bisects the North Pacific Ocean basin.

This chain of seamounts forms a continuous ridge, similar in scale to a continental margin, that spans a distance of over 1,000 miles. However, neither current patterns nor ecosystem relationships along this chain have been well-defined. Similarities in shallow water community structure along the chain indicate that some level of connectivity exists. Because only a small number of studies have been carried out in deeper water, the uniformity of habitats below 300m is largely unknown. Also unknown is whether the main islands supply organism recruitment to the northwest part of the chain, or vice versa. The upcoming expedition will provide an opportunity to identify ecosystem relationships in the Northwest Hawaiian Islands and develop instrumentation to assist in this quantification as part of a resources approach to seafloor ecosystem management.

Another upcoming project will be the search for chemical weapons disposed off the coasts of Hawaii. These weapons were put out in the 1940's, during and after the second world war. Large tonnages of these weapons including nerve gas and lewisite were dumped at sea. The search for these weapons is tricky because they have moved around over time. HURL is able to use a submersible-mounted mass spectrometer developed by Prof. Gary McMurtry. This portable deep-water mass spec is able to detect and quantify small amounts of leaking munitions.

Submarine canyons connect the shelf and the deep sea, and act as channels for transport of sediment, water, and nutrients. With a few exceptions, the deeper portions of submarine canyons have been largely inaccessible to researchers, and thus much of the knowledge about their function in ecosystems has been drawn from remote studies (e.g., CTD measurements) or has been inferred from shallow-water research (e.g., what happens at the canyon head at shelf depth). The upcoming expedition will offer researchers an opportunity for in situ research to depths of 2000m in the submarine canyons of the Hawaiian Ridge, Aleutian Ridge, and West Coast.

The solid earth plays an active role in setting conditions for marine ecosystems. Submarine fault zones, submarine landslides, and sediment transport have potential for significant natural seafloor disturbance. Methane hydrates and other sources of fluid and gas expulsion through the seafloor may be directly tied to cold seep ecosystems. All of these active geologic processes (and more) occur along the continental margins and submarine slopes of the Northeast Pacific. Human activity also has potential to disrupt and reshape marine ecosystems. These influences on benthic ecosystems can be investigated through manned submersible dives.

Biogeographical connections between isolated, distinctive environments such as seamounts, cold seeps, and whale falls appear to operate on a basin-wide scale. On a local scale, these sites also interact with the surrounding, 'normal' ocean environment.



Methods employed in submersible ocean resources studies typically include:

- Surveying areas prior to submersible and ROV dives using multibeam sonar. Most mapping activities are carried out upon arrival at the dive site and during night time operations and submersible service/weather days.
- Developing real-time maps and 3-D computer simulations based on the survey data while at sea and in post-processing ashore.
- Conducting visual surveys using a combination of ROVs and human occupied submersibles.

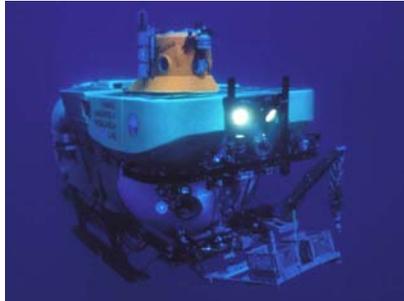
- Carrying out oceanographic observations including the use of CTDs and other instruments during night time and submersible service day operations.

- Collecting a consistent set of biological, chemical, geological samples at all target locations and depths using the submersibles and /or ROV.

Deploying individual sensors or a suite of in situ instruments at select locations to monitor physical and environmental conditions over time, i.e., explorations in the time domain. These include ADCPs, chemical sensors, temperature devices, CTDs, gliders, etc., and may interface with existing ocean observatories. All these instruments are deployable/recoverable using the Pisces, dropped over the side, and/or fitted with acoustic or time delay releases for recovery during or after the expedition. Instrument development is often a significant part of an expedition.

By using a consistent approach to gather, organize, and process these data, it is possible to facilitate post-expedition stud-

ies which produce widely circulated deliverables including data atlases and GIS packages, peer-reviewed articles and other reports.



Operations

Logistical constraints on dive targets: The depth limit of the Pisces submersibles is 2000m. Dives are designed to make good use of this capability, with no targets shallower than ~300m. Dives generally focus on benthic targets, as the submersibles are not well suited to mid-water operations.

Payload limitations, imaging capability, navigation, dive duration, and other tech-

nical issues, are fully described in the HURL Science Users Guide on the HURL website.

www.soest.hawaii.edu/HURL/HURL_Science_Users_Guide_rev6f.pdf

Standard Equipment:

- Manned submersibles *Pisces IV* and *Pisces V* with 3-person capacity and 2000m depth capability.
- ROV *RCV-150* with 914m depth capability.
- Support ship R/V *Ka'imikai-o-Kanaloa*, a 223ft research vessel equipped with wet and dry laboratories.
- A SeaBeam 2100-equivalent multi-beam sonar system, to be upgraded on the R/V *Ka'imikai-o-Kanaloa* in January, 2007.

Additional equipment compatible with submersible operations may be developed for an expedition. AUVs or ROVs are often deployed for night operations.

-John Wiltshire



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:

The University of Hawaii Foundation

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: _____

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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: admin@ore.hawaii.edu, **Tel:** +1 (808) 956-7572, **Fax:** +1 (808) 956-3498

New People: Welcome to ORE

*"The faculty welcome ALL!!
We hope you will have a
fruitful stay!"*

We have new people in our department who the faculty would like to welcome...

Pablo Duarte-Quiroga joined us in Spring 2006 and is going to undertake MS studies in the topic of numerical modeling of coastal processes under the supervision of Prof. Cheung.



Masoud Hayatdavoodi joined us in Fall 2006. He is currently a M.Sc. Candidate in Naval Architecture at Chalmers Univ. of Technology, Sweden. His thesis work on numerical fluid-structure interaction modeling are supervised by Prof. Frandsen.



Lei Yan, teaching assistant, joined us in Fall 2006 to undertake MS studies under the supervision of Prof. Cheung.



Simon Mortensen joined us in Fall 2006. He recently earned an MS from the DTU (Denmark). He is a visiting scholar and is participating in numerical modeling development. He is supervised by Prof. Frandsen. In 2007, he is returning to Denmark joining the Danish Hydraulic Institute.



Jeremy Bricker (PhD, Stanford University) joined us in Fall 2006. Dr. Bricker will be working along with Prof. Geno Pawlak studying wave and current boundary layer processes in support of ONR and NSF funded work.

Judith Wells joined ORE in May 2006 as an assistant researcher. Dr. Wells received a PhD in Physical Oceanography in 2003 from the MIT/WHOI Joint Program in Oceanography, Applied Ocean Science and Engineering. She worked previously as a postdoctoral researcher at the Center for Coastal Physical Oceanography at Old Dominion University. Dr. Wells will be working with Prof. Geno Pawlak examining the role of offshore internal tide processes on near-shore dynamics and coastal water quality as part of NSF and ONR funded projects.



Publications (2005–2006)

Year	Authors/Title	Journal	Vol.	No.	Pages	
2006	Becker, J. M., Firing, Y.L., Aucan, J., Holman, R., Merrifield, M. & Pawlak, G. "Video-based Observations of Nearshore Sand Ripples and Ripple Migration"	<i>Journal of Geophysical Research</i> (in press)				
	Frandsen, J.B. "Free surface water wave 1-D LBGK predictions"	<i>Intl. Journal of Computational Fluid Dynamics</i>	20	6	427-437	
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	Nunes, V. and Pawlak, G. "Observations of Physical Roughness Over a Coral Reef"	<i>Journal of Coastal Research</i> (in press)				
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Bai, Z. & J.C. Wiltshire "Porous structure of tailings of marine manganese nodules and crusts as deduced from the adsorption of nitrogen"		<i>Marine Georesources & Geotechnology</i>	23	3	195-208	

INSIDE ORE: Who's Who

ORE currently has 14 MS and 14 PhD students. We are going to learn more about what some of them are doing....

MS STUDENTS

Eric Sites received his BS in Civil Engineering from the Ohio State University in 2003.



Eric is currently a MS student working on a plan B thesis project under the supervision of Prof. R. Cengiz Ertekin. Work on the project is in the initial stages. The work will involve calculation of the wave induced motions of the Hawaii Superferry and loading/unloading barge while moored in Kahului harbor, Maui. Optimum mooring arrangements for the ferry will also be determined. The work is expected to be completed by April 2007. Eric is also working as an intern with Healy Tibbitts Builders, Inc. HTBI is contracted for the installation of the Superferry loading/unloading barge system.

Megan Crow, is a master's thesis student working with Prof. Cheung. She came to the department in the fall of 2005 after graduating from Michigan Technological University with a BS in Geological Engineering. She is pursuing the coastal engineering option of the ORE program. She is working on the Hawaii Tsunami Mapping Project. She is interested in the probabilistic return of tsunami inundation for the Hawaiian Islands. She is scheduled to graduate in the spring or summer of 2007. She is also happily married to Chet.



PhD STUDENTS

Liang Ge started his doctoral studies in Aug. 2004 under the supervision of Prof. Cheung. His thesis is entitled: "Stochastic models for Tsunami and Hurricane forecast and Hindcast."



This research will use the polynomial chaos expansion method to introduce the uncertainty variables in numerical models.

Yefei Bai is a Ph.D. student with a coastal engineering focus in ORE under the supervision of Prof. Cheung. His research topic is numerical simulation of wave evolution in coastal zone and related application. He is interested in wave shoaling, refraction, diffraction, and reflection due to varying bathymetry, such as steep slope, undular sea bottom, and seabed anomaly. He started his thesis in the 2005 fall semester.



Volker Roeber is from Kiel University in Germany holding a MSc in Coastal Geosciences & Engineering. He worked in Brazil for Petrobras (oil company) for one year. Then he came to the ORE department in Summer 2003 joining the Tsunami team right from the beginning. He worked on the topo-bathy database, conducted GPS surveys, and did measurements of bridge heights on the Northshore in order to produce our own topographic dataset. He then joined the NEES-

NSF project in fall 2005. The purpose of the project is to gain a better understanding of tsunamis and their interaction and loadings on structures, like bridges or buildings.



His advisor is Prof Cheung. He passed the PhD qualifying exam (the one and only of the old type!!) last December. He is scheduled to complete the PhD dissertation by summer 2009. He got married to Maiumi on December 1st 2004, still very much in love. He is also the proud owner of 9 surf boards and 3 windsurf boards.

Yongyan Wu joined the ORE department in Aug. 2004. Currently he is a Ph.D. candidate and research assistant under guidance of Prof. Cheung.

His research interests include the Riemann problem. It is a fundamental building block for nonlinear conservation laws. In the hydrodynamics field, a Riemann Solver serves as fundamental building block of numerical methods based on Godunov-type finite volume methods, as well as many other numerical methods such as Smoothed Particles Hydrodynamics and so on. To the best of our knowledge, till now there is no close form exact Riemann Solver for 2 D shallow water equations, not to mention the 3-D problems. Yongyan Wu is applying a new powerful analytical method to present a new analytical exact solution to the Riemann problem. The results will be applied to a higher order finite volume method of the shallow water equations including the high-order dispersive terms.



Next Issue

What's next?



- ◆ We expect several updates in terms of project development.
- ◆ We shall also learn more about student activities.
- ◆ News brief on publications and meetings will also be reported.
- ◆and much more!!



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**Engineering the Oceans
since 1966!**

ORE Website

www.ore.hawaii.edu

During the Summer/Fall 2006, we have updated our web site significantly...

Some of the highlights to point out is that you can now get information of our project in a descriptive format. We are also making an effort in posting notable achievements and fresh news frequently.

Our webmaster, ORE teaching assistant, Shailesh Namekar, and Prof. Frandsen, currently coordinates the ORE web site.

"Read about our new and exciting projects. Download course info and much more!!"

We would welcome your contribution in terms of "news", any ideas and comments you may have. Please, email:

frandsen@hawaii.edu



Shailesh Namekar is undertaking doctoral studies under the supervision of Prof. Cheung. His research focuses on tsunami forecasting using artificial intelligence techniques. He has published several articles. Learn more about his work: www2.hawaii.edu/~namekar/

Shailesh is expected to graduate in 2008.

Editor's Note Book

Heard at Conferences.....

The ICCE'06 held in San Diego (USA) had many interesting contributions. One new issue/concept was mentioned a few times: ...Compressibility effects in water may be important to for example wave run-up on beaches and impact sea walls. Some presentations were given on this topic. Two memorable ones were given by Prof. Peregrine, Univ. of Bristol (UK) and Prof. Dalrymple (Johns Hopkins).

*"Compressibility in water
maybe important"*

"The largest Hawaiian earthquake experienced in decades"



ORE 612 class, from left: Liang Ge, Yongyan Wu, Carl Lamm-Kittelsen (NTNU), Hongqiang Zhou (CE), Eric Sites.

Heard in the Department.....

Teaching & learning dynamics of structures are in many ways an interesting and exciting challenge. Fall 06 was a very special time at which ORE 612 was offered. We experienced water sprouts, impact on structures, earthquake (15 Oct.) and tsunami (15 Nov.) impact.

Theoretical & Practical examples of pulse loads.



The earthquake of magnitude 6.7 on the Richter scale with duration of about 15 sec. caused power outage state wide. Structural damage mainly occurred on Hilo.. In the same weekend the ore612 class had an assignment in which the student was going to address if an earthquake can be approximated as a pulse load. On the day of the tsunami, I was preparing the water waves lecture notes...the story can be repeated for each of these events.....Most unusual and exciting that all these rare events were happening as teaching the topics!

-Jannette Frandsen