

HANA O KE KAI

“Work of the Ocean”

NEWSLETTER OF THE OCEAN AND RESOURCES ENGINEERING DEPARTMENT, Spring 2015, Volume 18, Issue 2

Chair’s Message

Bruce M. Howe, Chair



As I mentioned in the last newsletter, ORE will be one of six engineering programs here at the University of Hawaii coming up for ABET accreditation reviews. We are receiving feedback from alumni and our advisory committees for the self study report that is due this July. The review board will visit in late November. The review six years ago went well, and we anticipate the same again.

SOEST continues to work on bringing the ROV *Lu’ukai* to operational status; Dan Greeson, John Wiltshire, Blue Eisen and I with others are involved with this effort. As Prof. Huang reports below work is progressing on the installation of Kilo Nalu Observatory 2 of Kewalo Basin; we are waiting for a good couple of days of calm weather and waves for installation. Mark Merrifield in Oceanography is providing significant assistance. For both projects, ORE students (and others) are very welcome to participate in the fieldwork (the next ROV cruise is 3-6 June), just ask! Best wishes to our new graduates, Derek Linsley and Morgan Stevenson, both now working here for Sea Engineering.

Have a good summer.

Editor’s Corner

Jonathan Koons, TA



I’d like to thank everyone for contributing to the newsletter this spring and for the last two years. You’ve really made this possible.

I hope everyone has a nice summer and that you enjoy this edition of Hana O Ke Kai...

Inside this issue:

Chair’s Message	1
Publications	2
Events	3
Inside ORE-John Craven	4
Aloha Cable Observatory	5
Lights! Cameras! Gliders!	6
Kilo Nalu Observatory	7
Game Show	8
Donor Form	9

Student and Faculty News

- **Alexander Morgan Stephenson** defended his MS Plan B Presentation “Implementation of CMS for Fringing Reef Environment” on April 22, 2015.
- **Derek Linsley** defended his MS Plan B Presentation “Critical Design Review of the Iroquois Point Beach Stabilization Project ” on April 22, 2015.
- **Professor Kwok-Fai Cheung** was given the “Resource Conservation and Climate Change Project-of-the-Year Award” from the Strategic Environmental Research and Development Program, Department of Defense, 2014.
- **John Craven**, a former professor in Ocean Engineering passed away this February

Some Recent ORE Publications

- Hayatdavoodi, M., Seiffert, B. and **Ertekin, R.C.** (2015), "Experiments and Calculations of Cnoidal Wave Loads on a Flat Plate in Shallow Water," J. Ocean Engineering and Marine Energy, Vol. 1, No. 1, February, pp. 77-99, DOI: 10.1007/s40722-014-0007-x, SOEST No. 9260.
- Ertekin, R.C.** (2015), "Foreword from the Editor-in-Chief," J. Ocean Engineering and Marine Energy, Vol. 1, No. 1, February, pp. 1-2, DOI: 10.1007/s40722-014-0012-0.
- Hayatdavoodi, M. and **Ertekin, R.C.** (2015) "Wave Forces on a Submerged Horizontal Plate, Part I: Theory and Numerical Analysis," J. Fluids and Structures, Vol. 54, April, pp. 566-579. DOI: 10.1016/j.jfluidstructs.2014.12.010, SOEST No. 9303.
- Hayatdavoodi, M. and **Ertekin, R.C.** (2015) "Wave Forces on a Submerged Horizontal Plate, Part II: Results," J. Fluids and Structures, Vol. 54, April, pp. 580-596. DOI: 10.1016/j.jfluidstructs.2014.12.009, SOEST No. 9304.
- Zhao, B.B., Duan, W.Y., **Ertekin, R.C.** and Hayatdavoodi, M. (2015), "High-Level Green-Naghdi Wave Models for Nonlinear Wave Transformation in Three Dimensions," J. Ocean Engineering and Marine Energy, Vol. 1, No. 2, May, pp. 121-132. DOI: 10.1007/s40722-014-0009-8, SOEST No. 9327.
- Zhao, B.B., Duan, W.Y., **Ertekin, R.C.**, Demirbilek, Z. and Webster, W.C. (2015), "A comparative study of the GN-3 and Boussinesq equations for nonlinear wave propagation," Proc. 30th Intl. Workshop on Water Waves and Floating Bodies, Bristol, UK, April 12-15, 4pp., DOI: 10.13140/RG.2.1.1195.2162.
- Korde, U.A. and **Ertekin, R.C.** (2015), "Wave Energy Conversion by Controlled Floating and Submerged Cylindrical Buoys," J. Ocean Engineering and Marine Energy, Vol. 1, No. 3, August, DOI: 10.1007/s40722-015-0021-7
- Seiffert, B.R., Hayatdavoodi, M. and **Ertekin, R.C.** (2015), "Experiments and Calculations of Cnoidal Wave Loads on a Coastal-Bridge Deck with Girders," European J. Mechanics - B/Fluids, Vol. 52, July-Aug, pp. 191-205, DOI:10.1016/j.euromechflu.2015.03.010, SOEST No. 9324.
- Seiffert, B.R., **Ertekin, R.C.** and Robertson, I.N. (2015), "Effect of Entrapped Air on Solitary Wave Forces on a Coastal Bridge Deck with Girders," J. Bridge Engineering, ASCE, DOI: 10.1061/(ASCE)BE.1943-5592.0000799
- Chen, Y., **B. M. Howe**, and C. Yang, Actively Controllable Switching for Tree Topology Seafloor Observation Networks, IEEE J. Oceanic Engineering, 10.1109/JOE.2014.2362830, 2014

Continued on page 3

Publications & Events

Recent ORE Publications... continued from page 2

Yue, H., Lay, T., Li, L., Yamazaki, Y., Cheung, K.F., Rivera, L., Hill, E.M., Sieh, K., Kongko, W., and Muhari, A. (2015). Validation of linearity assumptions for using tsunami waveforms in joint inversion of kinematic rupture models: Application to the 2010 Mw 7.8 Mentawai tsunami earthquake. *Journal of Geophysical Research: Solid Earth*, 120(3), 1728-1747.

Nihous, G.C., "Énergie thermique des mers : concept et ressources," <http://ense3-cms.ampere.inpg.fr/notices/energie-thermique-des-mers-concept-et-ressources>, Notice 041, Énergies des mers, Encyclopédie de l'Énergie, École Nationale Supérieure de l'Énergie, de l'Eau et de l'Environnement (ENSE³), Grenoble, France, 2014 (in French).

Nihous, G.C., "Énergie thermique des mers : histoire et perspectives," <http://ense3-cms.ampere.inpg.fr/notices/energie-thermique-des-mers-histoire-et-perspectives>, Notice 051, Énergies des mers, Encyclopédie de l'Énergie, École Nationale Supérieure de l'Énergie, de l'Eau et de l'Environnement (ENSE³), Grenoble, France, 2014 (in French).

Lee, Cheng-Hsien, Zhenhua Huang, and Yee-Meng Chiew. "A multi-scale turbulent dispersion model for dilute flows with suspended sediment." *Advances in Water Resources* 79 (2015): 18-34. DOI: 10.1016/j.advwatres.2015.02.002

Upcoming Events

The Acoustical Society of America Spring Meeting will be held in Pittsburg, Pennsylvania from May 18-22, 2015. <http://www.acousticalsociety.org/content/spring-2015-meeting>



34th International Conference on Ocean, Offshore and Arctic Engineering (OMAE2014) in St. Johns, NL, Canada from May 31-June 5, 2015. <http://asmeconferences.org/OMAE2015/>



OCEANS'15 MTS/IEEE Conference in Genova, Italy from May 18-21, 2015. <http://www.oceans15mtsieeegenova.org/>



25th International Offshore (Ocean) and Polar Engineering Conference will be held in Kona, Hawaii from June 21-26, 2015. <http://www.isopec2015.org>



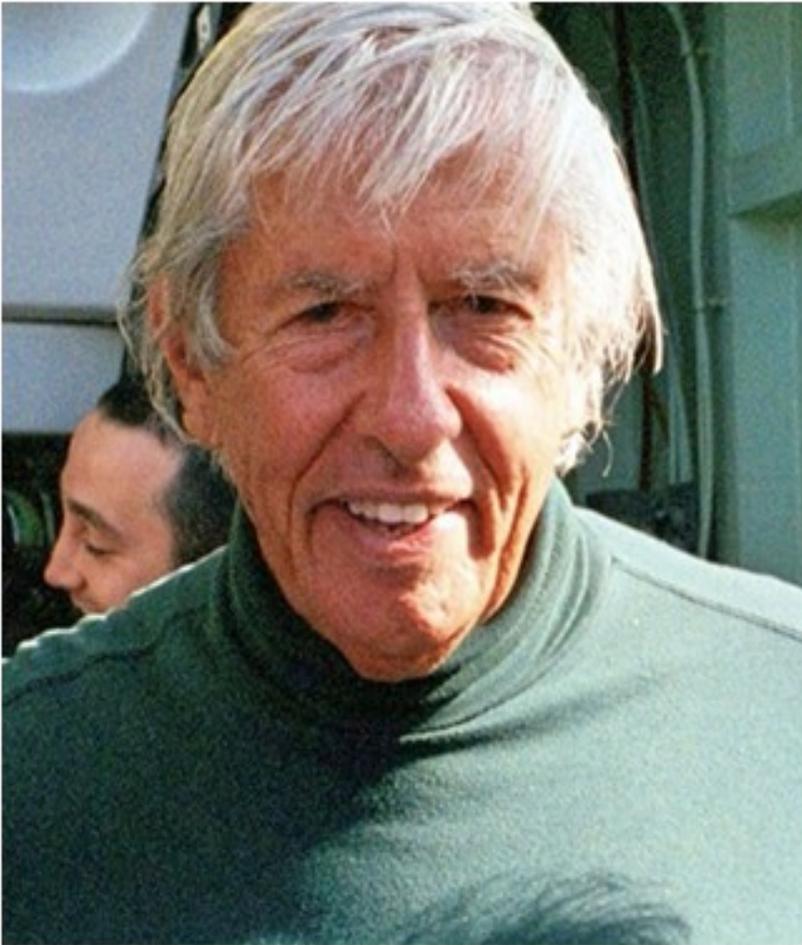
ISOPE-2015
The 25th International Ocean and Polar Engineering Conference
Kona, Big Island, Hawaii, USA
Ocean, Arctic and Energy June 21-26, 2015

Underwater Acoustics Conference and Exhibition will be held in Crete, Greece from June 21-26, 2015. <http://www.uaconferences.org/index.php/UACE2015>



Inside ORE

John Craven, a professor in Ocean Engineering, died this last February. John was active in the department from 1970 to 1991, serving on 22 student committees, 10 as chair, with interests from ship-building to floating cities and ocean thermal energy.



John P. Craven, 1924-2015

John Craven was the most illustrious and internationally recognized of ORE's distinguished faculty over the 50 years of the department's existence. Of his many accomplishments perhaps the greatest was the design and deployment of the Polaris nuclear missile aboard the US nuclear submarine fleet. Craven was the Chief Scientist of the program that gave the teeth to the Cold War policy of mutually assured destruction. This policy has been widely credited for preventing global nuclear war in the last half of the twentieth century. Beyond this world altering contribution, Craven had an interesting full, and eventful career. He served as chief scientist for the Navy special projects office and deep submergence systems. The latter involved finding and retrieving sunken US and Soviet submarines and the atomic bombs lost off Spain. He was responsible for Sea Labs II and III and the nuclear powered research submarine NR-1.

Upon personal invitation to come to Hawaii by Governor John Burns he was appointed Hawaii's Marine Affairs Coordinator (first and only) and also the first UH Dean of Marine Programs, to coordinate all the various activities at the State and University levels. He set up the Marine Options Program that is still running to this day. After a decade he stepped down and it was in the following transition years that SOEST came into being. He was the founding Director of the Law of the Sea Institute in the School of Law. He was instrumental in setting up the Natural Energy Laboratory (NELHA) on the Big Island, both for ocean thermal energy purposes, but also other uses of the cold deep seawater such as desalination, air conditioning and agriculture.

For more information about John Craven and his impact on the University and Hawaii, I recommend Dave Karl's history, *UH and the Sea*: <ftp://ftp.soest.hawaii.edu/dkarl/misc/dave/UH%26theSea/J-Chapter06.pdf>

Inside ORE

ALOHA Cabled Observatory Continuing Operations

Dr. Bruce Howe



The ALOHA Cabled Observatory (ACO) is a general purpose "node" providing power, communications and timing connectivity for science use at Station ALOHA 100 km north of Oahu (Figure 1). Included are a suite of basic sensors making core measurements, some local and some sensing the water column. At 4728 m deep, it is the deepest scientific outpost on the planet with power and Internet.

The NSF-funded project was started by Fred Duennebier, Roger Lukas, and Dave Karl in 2002. In 2007 the AT&T HAW-4 retired telecommunications cable was cut and one end moved slightly and a 'proof module' hydrophone attached. In June 2011, a general purpose 'node' was connected and the ACO has been providing power (1200 W), network communications (100 Mb/s) and timing (1 μ s) to the seafloor node and instruments. This last November, we serviced the equipment adding another camera and lights, and a basic sensor package, Figure 2. The observatory allows the capture of extremely rare episodic events, as illustrated in Figure 3. Station ALOHA is unique in the world for the combination of long-term world-class ocean sampling coupled with multitudes of short to long term process studies and other research.

We have just submitted an NSF proposal for 5 years of continued operations and maintenance. We are working to find funds for a mooring with profilers/winches to be able to address science questions spanning the water column, especially near the surface.

The new UH/SOEST ROV *Lu'ukai* will figure prominently in the coming years, servicing the system (see the accompanying article). Blue Eisen (MS 2010) is working as project engineer. ORE students have done class projects and continuing opportunities exist. We expect to go out this coming September to add yet more instruments and resolve some ground faults and failed lights. For more information about the ACO see the web page <http://aco-ssds.soest.hawaii.edu/dataDisplay.php>. Figure 3 is on page 9 of the newsletter.

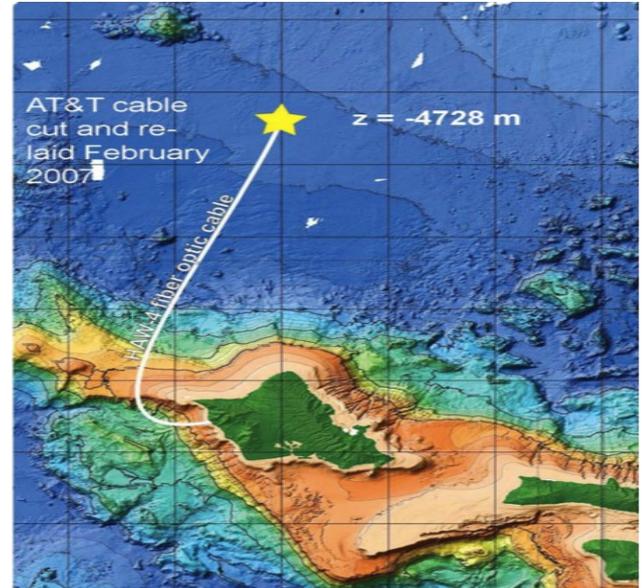


Figure 1. The ALOHA Cabled Observatory (ACO) is at Station ALOHA 100 km north of Oahu in 4728 m water depth.

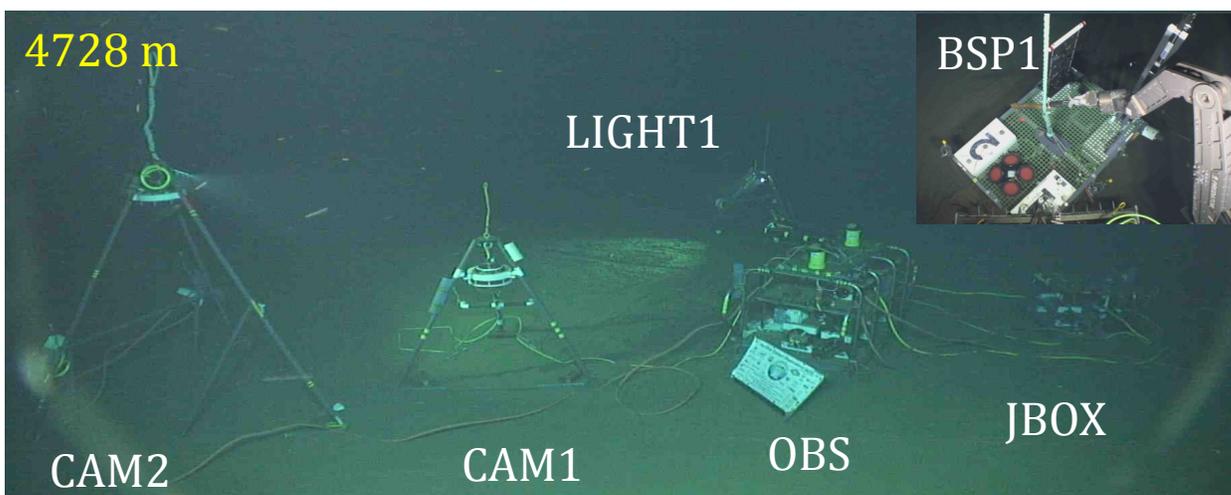


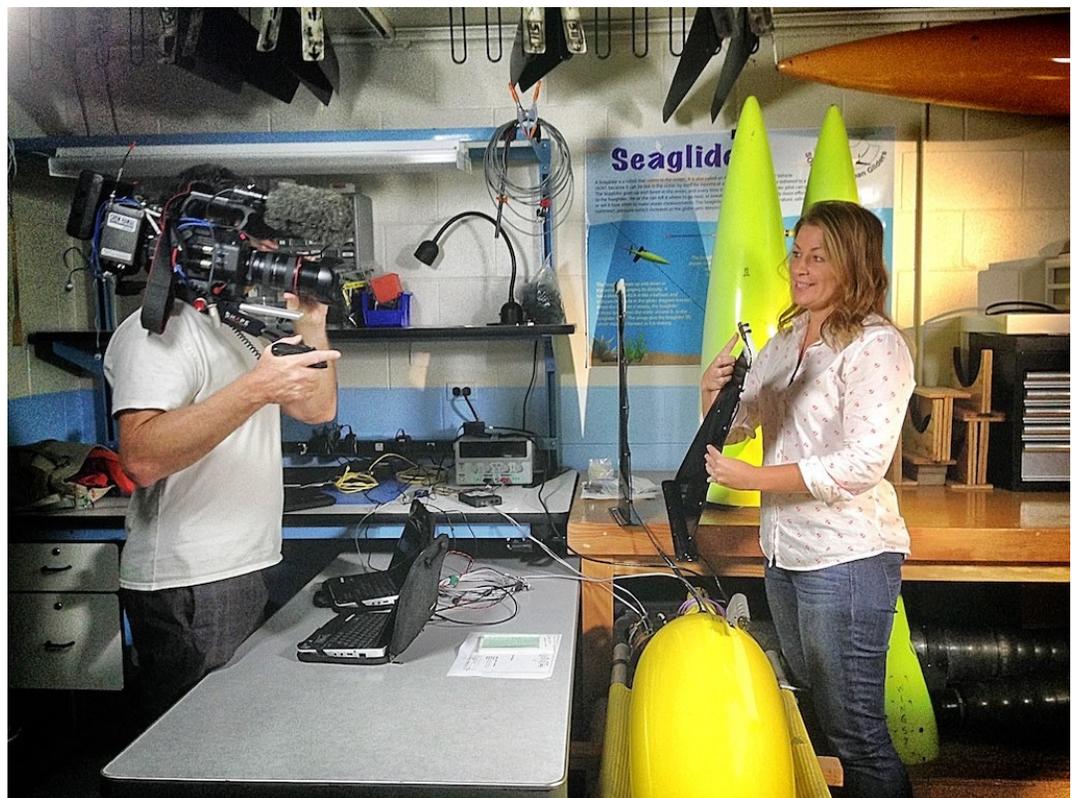
Figure 2: The current ACO configuration (November 2014). The BSP1 sits off to the right about 18 m; *Jason* is just about to cut floats above free. A banner with contributors is by the OBS (photos by *Jason*).

Inside ORE

Lights! Camera! Gliders!

The glider lab in HIG 155 is transformed into a filming set and Dr. Lora Van Uffelen, an ORE Assistant Researcher, is interviewed by NBC's "Caught on Camera with Nick Cannon" (<http://www.nbc.com/caught-on-camera-with-nick-cannon>) for a segment they are preparing about how drones, or, more specifically in this case, gliders, are revolutionizing the way we do science. The interviewers were interested particularly in how we are using gliders equipped with acoustic recording packages to record marine mammal vocalizations around the Hawaiian Islands. The air date for the TV segment has not yet been determined, but should be sometime before the end of the calendar year.

Photos by Sarah Searson.



Inside ORE

New Coastal Underwater Observatory Kilo Nalu Obs 2 in its Final Stage Before Deployment

Conghao Xu



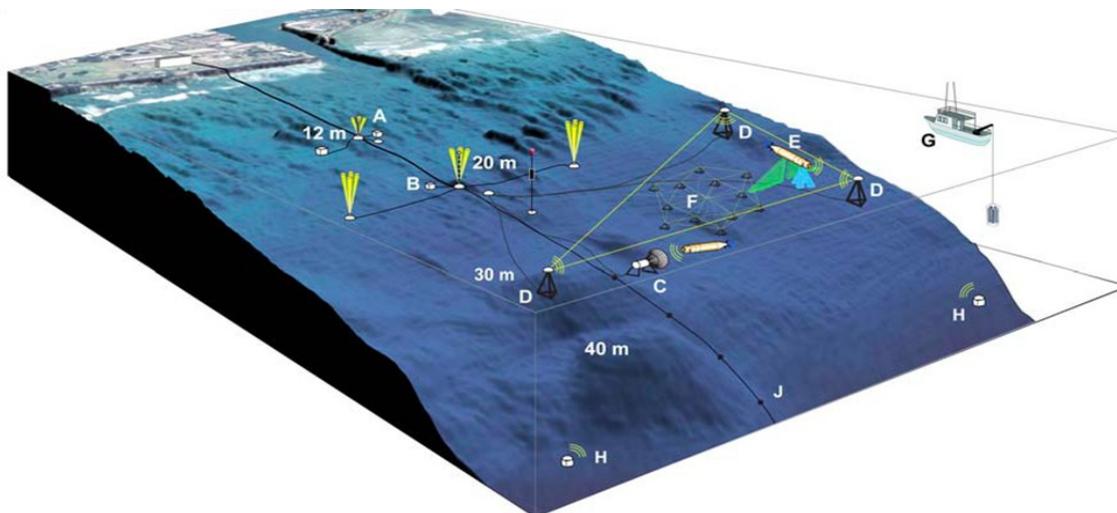
During an engineering test carried out at Makai Pier in April, the new generation Kilo Nalu Observatory system (which is called Kilo Nalu Observatory 2, or KNO2 for short) performed well at 15ft underwater on the seafloor. This test marks a significant milestone of the Kilo Nalu underwater observatory project, as a successful flag of the test will put the project team en route to the final deployment of the observatory system off of Kewalo Basin.



Deploying KNO2 at Makai Pier Test (Courtesy of Dr. Huang)

Kilo Nalu Observatory 2 is a predecessor to the first generation Kilo Nalu Observatory system (KNO) developed and operated in the time frame of 2004-2012, by Dr. Geno Pawlak. KNO2 identified and solved technical and maintenance issues experienced by KNO, and is aiming at long-term operation and future expansions. It consists of a shore station, a Junction Box (for passing power and converting optical signals to ethernet) and a primary node, an ADCP is connected to the primary node to record current and wave information. Many of the engineering and sensory parts of the system are synchronized by a precise timing system to provide a timing accuracy of less than 100 nanoseconds. Future plans includes adding AUV support, hydrophone, thermistor string, etc.

After the Makai Pier test, the project team is now performing more tests, working on the data processing, finalizing technical documentation, and preparing for final deployment off of Kewalo Basin in a water depth of 12m (~40ft).



Proposed KNO2 planning

KNO2 will be able to provide timely information for surfers who would like to ride waves nearby, as well as providing important scientific data to oceanographic/coastal engineering research. The observatory will also contribute to educational purposes to provide a chance to make classes more entertaining and practice-oriented.

Inside ORE– Second Annual Random Question Game Show

Eight contestants answered the following questions. The scoring was arbitrary and biased.
 Green = 3 points Blue = 2 points White = 1 point Red = negative 1 point
 The winner received the answer to number 6 in dollars and a T-shirt

1. What color would be the square root of purple?
2. How many University of Hawaii sporting events have you been to?
3. When is the last time you were in the ocean?
4. If you were on a boat that sunk and there was a two man life raft for yourself, Navier and Stokes, who would be treading water?
5. Bigger fear: spiders, snakes, sharks or ghosts?
6. Jane has two apples and is six years old. Suzy has a pet squirrel and half as many oranges as Jane's age and apples combined. Bob likes Matlab and steals half on Jane's apples and all of Suzy's oranges. How many pieces of fruit does Bob have after he trades one for broccoli?
7. Other than Holmes Hall, what is your favorite building on campus?
8. Part II, Chapter 5, Section 2 of the Army Corp of Engineers Coastal Engineering Manual covers what topic?
9. If you could dis-invent one thing, what would it be?
10. What is the eastern most state in the United States? What is the western most?

Question	Courtney	Andreaia	Vincent	Yaprak	Florian	Anonymous #1	Anonymous #2	Anonymous #3	Answer sought by judge
									
1	The note B Sharp	Green	Purple	Magenta	Black	Green	Complicated math performed	Purple^(1/2)	An actual color
2	0	3	0	3	0	0	< 5	> 1	At least one
3	This morning	Yesterday	Today	5/3/2015	Two weeks ago	3 years ago	Last year	Whenever I can	Within a month
4	Both	Navier	Me	Stokes	Take turns	Stokes	Me	Thought question stated he remained on sunk boat	Either Navier or Stokes
5	All < 609 final	Sharks	Snakes	Spiders	Spiders	Snakes	Snakes	Sharks	Not ghosts
6	4, Bob is a bully	4	4	4, Bob is bad	4	8	4	4	4
7	Leaving campus	Gym	Parking Structure	Korean Studies	Gym	Campus Center	Sinclair Library	Hamilton Library	East West Center
8	Classification of Water Waves	Classification of Water Waves	Never read it	Classification of Water Waves					
9	Facebook	Traffic	Stand Up Paddleboards	Weapons of Mass Destruction	Plastics	Artificial Intelligence	Video Games	Cellphones	Facebook or Twitter
10	Maine, Hawaii	Maine, Hawaii	Alaska, Alaska	Alaska, Alaska	Maine, Alaska	Florida, Hawaii	Maine, Alaska	Maine, Alaska	Alaska, Alaska (crosses into Eastern Hemisphere)
Total	18	17	19	20	16	12	12	17	

Congratulations Yaprak! You won \$4 and a T-shirt. We are bad at geography.

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:

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: _____

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



Figure 3. The video frames show a lizard fish attacking an aristeid shrimp, a rare ~1 s event. (J. Drazen and A. Fleury)

....continued from the ALOHA Cable Observatory article on page 5



Hana O Ke Kai

Newsletter of the
 Department of Ocean and Resources Engineering
 School of Ocean and Earth Science and Technology
 University of Hawaii at Manoa

2540 Dole Street, Holmes Hall 402
 Honolulu, HI 96855-2303
 USA

TEL: +1(808)956-7572
 FAX: +1(808)956-3498
 Email: adminore@hawaii.edu
 URL: http://www.ore.hawaii.edu

To subscribe, obtain copies of previous issues of HANA O KE KAI and send your material for the newsletter publication, please visit the above URL and then click the 'News' link.

**ENGINEERING THE
 OCEANS SINCE 1966!**