



“Lunch on Board the Titanic - Two Miles Deep in the Atlantic” - HMSC hosts famed undersea explorer Captain Don Walsh

Captain Don Walsh, famous for a lifetime of pioneering experiences in ocean exploration, delivered a special evening lecture at HMSC in November - “Lunch on Board the Titanic - Two Miles Deep in the Atlantic.” Through photos and anecdotes, Walsh shared his experience diving on the RMS *Titanic* in 2001 in the MIR submersible to a captivated audience of well over a hundred people. Earlier in the day, Walsh presented a research seminar chronicling the history of undersea exploration, describing the evolution of manned vessels designed to probe the oceans’ depths. Walsh made history co-piloting the bathyscaphe *Trieste* in 1960 to the ocean’s greatest known depth, the Challenger Deep in the Mariana Trench, at a depth of 35,840 feet. The historic dive received worldwide attention. It also remained a world record dive for 52 years until James Cameron piloted his Deepsea Challenger to the same place in 2012.

While in Newport, Walsh also inspired the Oregon Coast’s youngest generation of explorers when he visited Newport Intermediate School on Friday November 15.

After retiring as captain from the U.S. Navy, Walsh went on to enjoy a lengthy career as an oceanographer and ocean engineer who explored the deep oceans and polar regions. He has commanded submarines as a naval officer and deep-sea submersibles as a researcher. Walsh is Honorary President of the Explorers Club, and has been honored for his four decades of work in the design, construction and operation of undersea vehicles. He also serves as a courtesy professor in OSU’s College of Earth, Ocean and Atmospheric Sciences.



Innovations

Exploring the Zooniverse of Plankton

by Jessica Luo, Graduate Student, University of Miami and HMSC

Imagine exploring the open ocean, diving hundreds of feet deep, and observing the unperturbed ocean and the myriad animals that inhabit this last frontier on earth. Well, now you can, from the comfort of your own home.

“Plankton Portal” (www.planktonportal.org) is an online citizen-science project developed by Dr. Bob Cowen’s research group at HMSC and the University of Miami, including graduate students like myself, in collaboration with developers at The Zooniverse. We’re inviting armchair scientists and plankton enthusiasts to join us on an adventure to the unexplored ocean, identifying and measuring dozens of species of jellyfish and crustaceans.

The plankton images on Plankton Portal are taken by the *In Situ* Ichthyoplankton Imaging System (ISIIS), a cutting edge instrument developed by Dr. Cowen’s lab. It combines shadowgraph imaging with a high resolution camera for plankton imaging.



“ISIIS gives us a new view on plankton, enabling us to see them in their natural setting, where they occur, what other organisms are nearby, even their orientation,” explains Cowen.

The dataset used for Plankton Portal comes from a project from the Southern

California Bight, where Cowen’s team imaged plankton across a front, which is a meeting of two water masses, over three days in Fall 2010. In three days, the team collected data that would take them more than three years to analyze.

Plankton Portal launched this past September, and in the last two months has generated over 260,000 classifications by nearly 2,500 volunteers. Most volunteers classify fewer than 50 images, but the most dedicated citizen scientists have made over 30,000 classifications! Volunteers have helped identify interesting new behaviors in jellyfish, such as the first reported documentation of a small hydromedusae, *Liriope tetraphylla*, feeding on an arrow worm.

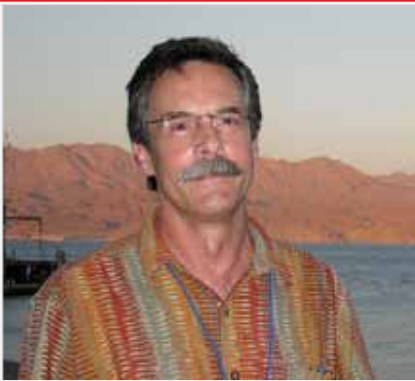
Many more discoveries are possible as citizen scientists delve into the data over the next year. You can also join in on the fun! Just visit www.planktonportal.org

Photo: Home page of the Plankton Portal website.

Notes from the Director

As I take the helm as the new Director of HMSC, I do so on the shoulders of the Directors before me who have so ably steered HMSC along its course. I wish past Director, George Boehlert, godspeed in his retirement journey and thank him for his ten years of service to HMSC. As George before me, I am privileged to be able to work with the many dedicated staff, colleagues, and students at OSU and our partner agencies, the amazing volunteers who staff our Visitor Center year round, and the local community of Newport, Lincoln County, and all along the Oregon coast. The future of HMSC is very exciting as OSU makes plans for expanding the educational program here and, in so doing, extending its academic mission to encompass the entire coast of Oregon. I look forward to this leg of HMSC's incredible voyage and sharing in all of its great successes.

Since my arrival in late July, I have had a quick lesson on the vast breadth of scientific, educational, and outreach activities that take place here at HMSC on a regular basis. This issue of *Upwelling* highlights just a small portion of these diverse activities: From the many improvements and innovations in the Visitor Center made possible by a generous gift from the Partridge Family,



Dr. Bob Cowen, HMSC Director

to the National Weather Service's recognition of Clayton Creech for his 37 years of dedication to the development and maintenance of HMSC's weather station. HMSC also received recognition from the Northwest Aquatic & Marine Educators (NAME) for its leadership in marine and aquatic education.

During the late summer, HMSC and OSU College of Earth Atmosphere and Ocean Sciences served as host to the 2013 PICES Summer School on "Ocean Observing Systems and Ecosystem Monitoring." The course included students from nations around the Pacific and was led by OSU and HMSC faculty and staff. And in early November we hosted the intrepid deep-sea explorer and retired naval captain, Don Walsh, as he gave two (!) auditorium-packed lectures on his underwater explorations and adventures beginning as the first naval commander of the *Trieste* and then exploring the *Titanic*.

Dive in and enjoy this issue of *Upwelling* to get a glimpse of the exciting work and fun that occurs here at the Hatfield Marine Science Center.

2013 Lavern Weber Visiting Scientists

Drs. Alyssa Joyce and Pierre De Wit, from the Sven Lovén Center for Marine Sciences, Gothenburg University, Sweden, visited HMSC in September with support from the Lavern Weber Visiting Scientist Fellowship. The purpose of their visit was to work with Dr. Chris Langdon in studying the effects of ocean acidification on oyster larvae. In the last 7 years, summer upwelling has brought acidified water onshore, creating ocean acidification (OA) conditions that adversely affect the growth and survival of oyster larvae at commercial hatcheries. This has resulted in a 'seed crisis' where the availability of oyster seed for West Coast oyster growers has become limited. Hatchery operators report that larvae derived from selected broodstock of Dr. Langdon's Molluscan Broodstock Program (MBP), which has been producing and selecting Pacific oysters since 1996, perform better than larvae from wild oysters during periods of upwelling. The project involving Drs Joyce and De Wit was designed to compare the performance of larvae from these two groups of broodstock oysters under controlled laboratory conditions. The first phase of the project this fall involved developing a flow-through test system. The second phase, planned for next year, will involve exposing larvae to OA test conditions and measuring the physiological (Joyce and Langdon) and genetic (De Wit) responses. These laboratory experiments are expected to provide a better understanding of the effects of OA on larval physiology and provide genetic tools that can be used to evaluate the degree of stress in larvae exposed to OA conditions.



Thank you for your support. To become a member of the Friends of HMSC, or for more information, please see <http://hmsc.oregonstate.edu/supporters/>

Exhibit News

The Visitor Center received a very generous donation from the Partridge family. The gift allowed the Visitor Center to build the new Corals and Biomedical live animal exhibits, as well a replacement tank for the badly decaying 6 rack tank - a series of tanks featuring animals used in current research at HMSC. All of these new tanks have been designed to be



moveable, and versatile in any exhibit space so that they will serve the visitor center for many years to come.

A new exhibit, The Evolution of Ground Fish Trawling was

just installed. The exhibit focuses on the evolution of trawl practices over the years, the anatomy of a modern trawler and how the industry is regulated. The exhibit also features an iPad game that lets visitors experience the risky business of working as an Oregon trawler, and a real-time ship tracker showing the commercial fleet's daily activities.

Good Luck Harrison

Harrison Baker, Visitor Center Aquarist and Free-Choice Learning Masters student is defending his masters thesis mid-December and will be leaving us after 4 years of work with the VC and the free-choice learning lab. We have laughed every day thanks to Harrison - his quirky humor, self-effacing observations, and social commentary have been a complete delight to us all. Thanks Harrison - you will be missed.



Photo: Harrison Baker checking out a situation in the Visitor Center's touch pools.

Aquarists Corner



Sashay's release 11/26/2013

Saying Thanks

by Colleen Newberg, HMSC Senior Aquarist

We gave a fond farewell to one special animal as we released Sashay our exhibit octopus on November 16. She arrived at HMSC in January 2013 and has been a visitor and staff favorite for almost a year. Sashay was an excellent exhibit octopus as she was always seen socializing with visitors and staff alike. She was unlike most other octopuses that normally hide in the darker areas of the exhibit. Visitors normally have to look hard to see the octopus on exhibit. With Sashay it was a different story. Visitors were always greeted by her as she could be found stuck to the front of the exhibit or moving around her exhibit exploring her surroundings. We are thankful for fun animals such as Sashay that not only entertain, entrance, and educate our visitors but the staff too! We wish her luck with her new found freedom.

Sashay's arrival at HMSC 1/2013



Sashay on exhibit - exploring her tank

HMSC Briefs

Roads Scholar Engagement Tour



"Dock Walk"— one of the Roads Tour 2013 events in Newport.



Octopus Experience - one of the Roads Tour 2013 events at HMSC.



Net maker Sara Skamser talks to OSU faculty and staff about her business and her relationship with OSU. Her net shop was one stop during the 2013 Roads Tour visit to Newport.



Sea Grant Marine Educators have stayed busy through the fall season with various events for students and teachers. Career Day on November 15 engaged 11 high schoolers from the state of Oregon, and 23 teachers attended the Wave Energy Teacher Workshop on November 16, sponsored by the Oregon Coast Regional STEM Center and Northwest National Marine Renewable Energy Center (NNMREC). In addition, over 100 home schoolers came to Hatfield on November 8 to learn all about marine mammals with their families!



Above: Teachers exploring the Wave Energy exhibit in the Visitor Center at HMSC

Left: High School students touring the RV Oceanus during the November 15th Career Day at HMSC.

Volunteer Corner



In August, **Doug Purcell** was awarded the Retired Senior Volunteer Program (RSVP) Volunteer of the Month Award. As part of the award he received a dinner for two at Chinook Winds and his praises were sung both on the RSVP website and in the newspaper. Doug has been volunteering at HMSC since 2005 and has accumulated 1,555 hours of service. Every Monday he feeds the animals in the VC during open hours so the public can participate and ask questions. After his shifts are finished, he often walks along the estuary trail to pick up trash. Doug is very active in the community and also donates time and energy volunteering at the Oregon Coast Aquarium and at the Yaquina Head Outstanding Natural Area. Congratulations to Doug and thank you for all you contribute to this agency and others.



PICES summer school

In August 2013, students from all over the world met at HMSC for the **North Pacific Marine Science Organization (PICES) summer school** on “Ocean Observing Systems and Ecosystem Monitoring”. The summer school consisted of lectures from various HMSC and OSU staff, laboratory demonstrations of ocean sensors, an introduction to ocean observing platforms, and fieldwork on the R/V *Elakha* to deploy ocean-observing equipment. PICES is made up of 6 member nations, with students from each at the Summer School (USA, Canada, Russia, China, Korea, Japan). HMSC and the OSU College of Earth, Ocean and Atmospheric Sciences hosted the event.



West Coast Ocean Acidification Panel



In August 2013, Oregon Governor John Kitzhaber announced a new panel established by Oregon and California to focus on the extent, causes, and effects of ocean acidification and hypoxia along the Pacific coastline. **The West Coast Ocean Acidification and Hypoxia Science Panel**

brings together scientists from Oregon, California, Washington, and British Columbia to develop strategic recommendations for researching and monitoring ocean acidification and hypoxia in the Pacific Ocean.

Five Oregon State University researchers will participate on the new panel: Jack Barth, Francis Chan, Burke Hales, George Waldbusser, and Waldo Wakefield (shown in photo). Waldo is a scientist with NOAA Fisheries’ Northwest Fisheries Science Center at HMSC and serves as OSU courtesy faculty.

Photo at left by David Reinert, OSU.

Honor Roll

HMSC was honored with the Organization Award at the **Northwest Aquatic & Marine Educators (NAME)** conference in British Columbia in July 2013. Nominated by Fawn Custer, the award recognizes a “non-profit or local/state/regional agency for leadership in marine and aquatic education.” The nomination highlighted

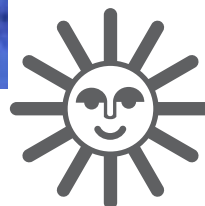
Sea Grant’s youth education programs at HMSC, which have grown to over 11000 formal education participants, as well as OSU’s graduate and undergraduate programs that engage the next generation of marine and aquatic educators. HMSC has supported NAME since 1992.

The award was presented to HMSC director Bob Cowen (left), shown with Sea Grant’s Bill Hanshumaker at the annual Volunteer Appreciation BBQ in August.



‘Weatherman Emeritus’ **Clayton Creech** was honored with the John C. Holm Award for extended service to the National Weather Service’s (NWS) Cooperative Weather Observers Program. Over 35 friends and colleagues attended the ceremony on November 7 in the HMSC Guin Library. Clay (right in photo) has operated the NWS rain gauge located at Oregon State University’s Hatfield

Marine Science Center for 37 years. Clay’s vision and creativity made the HMSC weather station web page the most used component of the HMSC web site. Look for it under the Marine Science Central tab at hmsc.oregonstate.edu.





Math Camp for New OSU Graduate Students

College of Earth, Ocean and Atmospheric Sciences (CEOAS) Math Camp OC599 occurs just prior to the official start of the traditional fall term. Graduate students take the course in preparation for their program. Team taught by Professors Dudley Chelton and Bill Smyth in CEOAS, students apply trigonometry, geometry and calculus to oceanographic principles combined with hands-on visits to field sites, labs and vessels and marine resources.



Photo left: Math Camp students Allan Lerner and Allison Einolf (left and right) and Teaching Assistant Steve Drake (middle) looking at the extensive biofouling of the LOBO (Land/Ocean Biogeochemical Observatory) mooring in Yaquina Bay from which long-term time series of salinity, nitrate and turbidity were analyzed as part of the course material in Math Camp.

Photo right: Paul Komar explaining the reason for the cobble beach below Yaquina Head during a beach processes field trip with Math Camp students.



Above: Paul Komar explaining the reason for the fine-grain sand on Moolack Beach north of Newport during a beach processes field trip with Math Camp students.



Students on the Go



Latreese Denson, Erin Fedewa, Marisa Litz, and Kate Self (l to r), were among the HMSC Graduate Students who attended the North Pacific Marine Science Organization (PICES) conference in October 2013. Students took a road trip together to attend the conference on Vancouver Island in British Columbia along with their faculty mentor, HMSC Associate Professor Jessica Miller (not shown).



OSU Fisheries and Wildlife Graduate Student Organization toured HMSC in September. Erin Fedewa and Sophie Pierszalowski helped organize the visit to learn about HMSC and bridge graduate students from both campuses. *Photo:* Shawn Rowe and Bill Hanshumaker explain the education, outreach and research activities of Oregon Sea Grant in the HMSC Visitor Center.



The 2013 U-Engage course in marine science, entitled *Lunar Forces, Edible Sea Vampires and Other Curiosities of the Sea*, visited HMSC in October. First year OSU students heard from student researchers about research projects in the Coastal Ecology and Resource Management course (FW 426/526). The course is offered at HMSC every fall through the Department of Fisheries and Wildlife (FW). *Photo:* Josh Etherton, FW Undergraduate explaining his research on successional rates of fish entering intertidal eelgrass beds following low tide.



OSU Undergraduate Life Science Club stayed overnight in the Oregon Coast Aquarium before coming to HMSC on Saturday, 11/16, to learn about courses, programs, research opportunities in marine science. They toured HMSC's seawater system with Facilities staff member Tim Terris at HMSC during their visit.

Coastal Oregon Intensive



Of 11 students taking Coastal Ecology and Resource Management (CERM) this 2013 fall term at HMSC, most are undergraduate students from the Department of Fisheries and Wildlife. The course started with an intensive week of field trips and lectures that were designed to introduce students to the diverse ecosystems of coastal Oregon, as well as current management issues. The topics ranged in geography from watersheds to oceans, and in scale from microscopic phytoplankton to whales. After the first intensive week, students continued the course with lectures and short field trips. Throughout the term, students will work on research projects that they present in a poster session on December 11. This year, projects cover a wide range of topics from the effects of global climate change on arctic walrus populations to effects of tide gates on returning salmon.

Some examples of research projects in the CERM course are:

- Joshua Etherton – *Successional rates of fish entering intertidal eelgrass beds following low tide*
- Cole Hendrickson – *Comparison of Abiotic Similarities between Cascade Head Marine Reserve and Local Comparison Sites*
- Jordan Massie and Andrew Futerman – *The presence and prevalence of trematode parasites in juvenile steelhead trout, *Oncorhynchus mykiss**
- Sammantha Payment and Alexander Woolen – *Trends in Recreational Crab Harvest Yaquina Bay, Oregon*
- Andrea Barry – *Evaluating the effects of essential fatty acids on growth in juvenile chinook salmon (*Oncorhynchus tshawytscha*) and the implications for marine based food webs*

Photo above: OSU Fisheries and Wildlife undergraduate and graduate students updating the CERM class on their research projects using HMSC's distance education classroom. Research projects explore real-world research questions under the guidance of faculty mentors.



Photo: Field trip to the Ten Mile Creek Sanctuary with Paul Englemeyer (on far left) during the intensive first week of CERM. The students are posed in front of two old broad-leaved maples that grew in a clearing formed by a past homesteader on the creek.





Hatfield Marine Science Center

2030 SE Marine Science Drive
Newport, OR 97365
www.hmsc.oregonstate.edu/friends

Mark your calendar for Marine Science Day, April 12, 2014!

See: <http://hmsc.oregonstate.edu/marinescienceday/>

How do young fish fare in hypoxia?

*by Morgan (Mo) Bancroft,
OSU-HMSC Graduate Student, CEOAS*

It happens during summer upwelling off the coast; at a time when productivity is high and juvenile fishes and invertebrates should be thriving, suddenly oxygen levels plummet. ROV video has shown how adult populations are impacted by critically low dissolved oxygen (DO) during severe hypoxic, or low oxygen, years – scenes of fish and crab carcasses lolling about on the ocean floor in gentle surge can be overwhelming. Video provides a snapshot of such events where adult organisms are easily seen, but much smaller larval and juvenile organisms may not be as apparent. They may even be more susceptible to low DO; so, how does extended exposure impact early life development in nursery habitats? My research is aimed at answering these kinds of questions.

I am a graduate student seeking a master's degree in Marine Resource Management under the joint guidance of Drs. Lorenzo Ciannelli of the Fisheries Oceanography Lab at OSU and Cliff Ryer of the Alaska Fisheries Science Center in Newport, OR. I am studying the effects of hypoxia and temperature on the growth of juvenile English sole and Dungeness crab in a controlled laboratory setting. My experimental set-up is located in the Research Support Facility (RSF) at the Hatfield Marine Science Center, and is comprised of twenty one fish tanks. It is capable of simulating a range of temperatures and DO levels found during the spring and summer months along the Oregon Coast and in Oregon estuaries.

My research has been generously supported by the Oregon Sea Grant, a Mamie Markham Research Award, a William Q. Wick Marine Fisheries

Award, and a Geoffrey Dimmick Memorial Fellowship. I am tremendously grateful for the opportunity that I have been given to study at such a prestigious marine science center. Thanks to all who support research at HMSC and OSU!

