Winter 2016 Issue 5

Rising Tides

A Publication of The University of South Florida College of Marine Science

Contents

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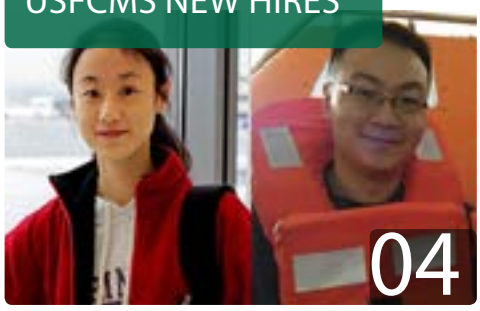


Message from the

Dean

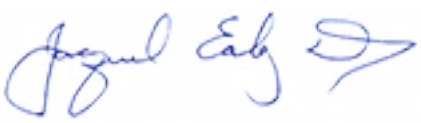
"We are **enthusiastic** about reseach and education opportunities"

I hope you enjoy this issue of Rising Tides. The College of Marine Science continues to excel in research and graduate education. In February, faculty members Kendra Daly, Steve Murawski, and myself were inducted as Fellows of the American Association for the Advancement of Science. Combined with existing Fellows Bob Byrne and Eugene Domack, that means twenty percent of our faculty are now AAAS Fellows!

In this issue, you will be introduced to our new faculty members: Assistant Professor Xinfeng Liang from MIT; and Research Assistant Professor Yun Li from Woods Hole. Professor Brad Seibel, who comes to us from the University of Rhode Island, has also became a new faculty member in the College of Marine Science. He will be featured in the next issue of Rising Tides. We are thrilled that they all have joined our ranks and look forward to their contributions both in research and teaching.

I also want to make a short comment on an issue that keeps me up at night. A recent article on plastics in the ocean was particularly disturbing (The New Plastics Economy: Rethinking the future of plastics report by the World Economic Forum, The Ellen MacArthur Foundation, and McKinsey & Company, 2016). Today, the ratio of plastics to fish in the ocean is 1:5. Every minute, the equivalent of one dump-truck's worth of plastic is dumped into the sea. By 2050, it is predicted that there will be more plastic in the ocean than fish. This is unthinkable. I'm so proud of Frank Muller-Karger's and CJ Reynolds work with the NOAA Marine Debris Program to help educate the community about plastic pollution. The Current Collections sculpture, made from plastic trash collected in our community, has been given a permanent home in Poynter Park on the USFSP campus. Let's all make a vow to eliminate or at least reduce our use of plastic bottles, to recycle what we use, and to stop using plastic straws (my own pet peeve).

Sincerely,



Jacqueline Dixon
Dean, College of Marine Science
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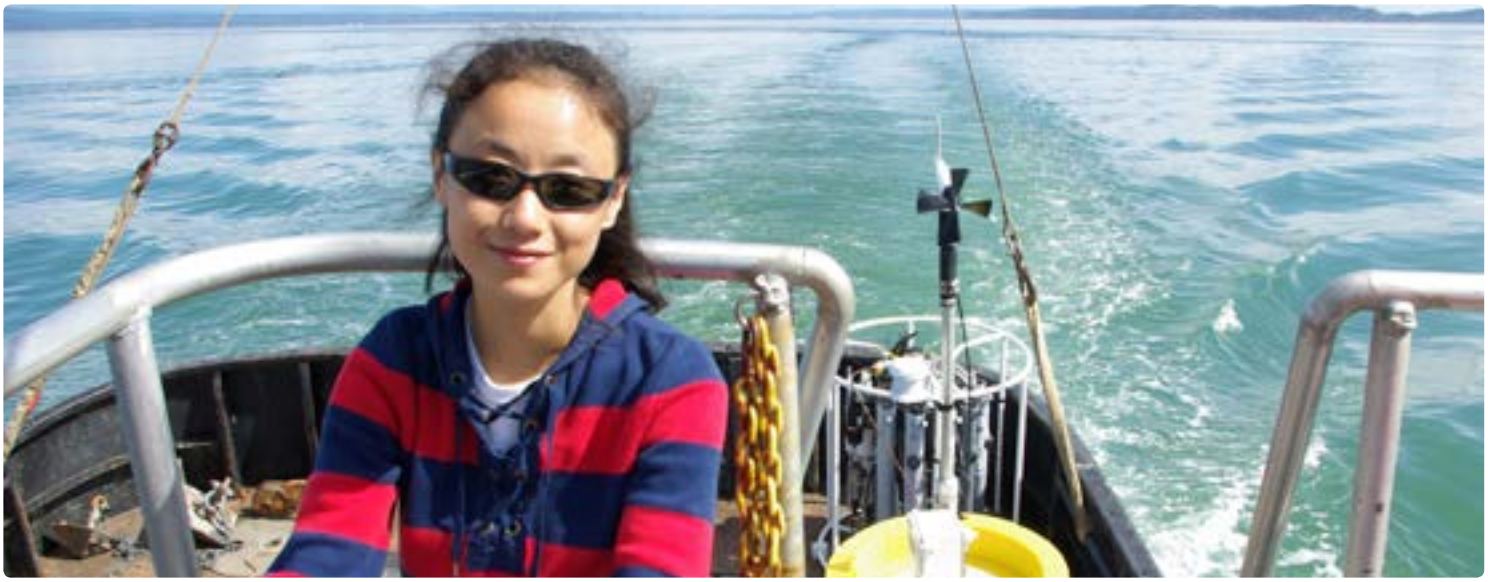
Faculty Spotlight

Yun Li, Assistant Research Professor



Yun Li on R/V Centennial during a buoy recovery cruise in Skagit Bay, WA in 2009. Photo credit: Elisabeth Schulz

It has been twelve years since I received my B.S. in Marine Science from Ocean University of China (OUC). Over these years, I never left the field of oceanography. I jointed the PhD program at University of Maryland Center for Environmental Science (UMCES) in 2006, and gained invaluable experiences on numerical modeling, complemented by observational and theoretical training, to study marine environmental sciences, with special focus on the dynamics of estuarine hypoxia. Upon the completion of my PhD studies, I started to work at Woods Hole Oceanographic Institution (WHOI) as a postdoc in 2012, and my research was focused on the responses of primary production to environmental drivers and their impacts on higher-trophic level predators. The projects have broadened my research experience, especially from estuaries to shelf and open seas, from mid- to high-latitudes.

Going back further, as a graduating high school senior, I was fascinated about math, physics and chemistry. I won a number of awards from state competitions, but struggled quite a bit to find a major that could tightly integrate all my favorite disciplines. I grew up in Kaifeng, a small inland city in North China. Most residents never see the ocean in their entire life, not to mention to study marine science. I was so lucky to hear from a student recruitment representative about one of the few marine science programs in China. I then made a very quick yet one of the best decisions in my life. I have never regretted becoming an oceanographer, because it was quite a challenging yet deeply satisfying experience. During my PhD at UMCES and postdoc at WHOI, I was fortunate to study diverse and broad topics on marine ecosystem, and it was always full of excitement to apply prototype and/or novel concepts to understand the ecosystem dynamics, which has becomes a central theme of my research.

Not only does marine science provide me a promising career, it also helped me meet my husband Dr. Xinfeng Liang, who is my best colleague, friend and soul mate. We first met each other at weekly lab meetings, and our relationship progressed rapidly as the oceanography became our common language. There have been many challenges in my career path, and I appreciate that Xinfeng was highly supportive - from studying abroad to seeking academic positions - he always stood by me and encouraged me to pursue my career goals. About two years ago, when I was a postdoctoral investigator at WHOI, our first child Anna was born. Like many dual-career couples, Xinfeng and I faced challenges on advancing careers in a competitive research environment and balancing work and family. With numerous help and invaluable advice from amazing advisors and collaborators, and with continued support from our parents, to my big surprise, I became even more productive over the past two years than ever in developing publications and proposals. I am so looking forward to the new challenges in front of me, and I will continue my passion about marine science at USF.

Faculty Spotlight

Dr. Xinfeng Liang, Assistant Professor, Physical Oceanography

Xinfeng Liang in 2012, during a cruise to the Southern Ocean, stopped at the Falkland Islands to see some friends.

Being born and raised in a small inland village in China, I had not seen the ocean in person until I got into the Ocean University of China in Qingdao in 1999. Since then, oceanography has been an important part of my life, not only my major but also my passion. I have been enjoying many of the fantastic experiences of being an oceanographer, such as cruising to the Southern Ocean, diving to the mid-ocean ridges and better understanding how the ocean works.

After obtaining a bachelor degree and working as a research assistant in the Ocean University of China for a few years, I decided to pursue my oceanographic career in the United States. (Another reason is my wife, then girlfriend, Yun Li, who is also working in the college now, got accepted by the PhD program at University of Maryland in 2006.) Fortunately, I was admitted into Lamont-Doherty Earth Observatory (LDEO) of Columbia University in 2007. At LDEO, my study focused on the ocean mesoscale and small-scale processes, particularly the influence of mesoscale eddies on deep ocean physical processes, such as internal waves and ocean mixing. My main research approach was then a combination of satellite and in-situ observations.

After getting my PhD in 2012, I decided to expand my research from small- and mesoscale to basin- and global scale processes. I also wanted to learn new approaches to study the ocean. I then joined Prof. Carl Wunsch's group at MIT, where I had quite a lot of freedom to pursue my own interests and received invaluable suggestions and help from the whole group. During my postdoc period, I became familiar with the ocean state estimation system and learned how to utilize the available estimates to study the ocean's roles in the climate system.

Last year, when the college had an opening, I was very excited to see that I was a good match and applied for the position. When I arrived at the college for an interview (almost exactly one year ago), I was deeply impressed by the friendly atmosphere and beautiful environment. I decided that if I had the opportunity, I would like to work here. Luckily, it turned into reality now. I have been at the college for about one month. So far, everything is great. In the future, I hope I can quickly adapt to the new environment and work together with the world-leading faculty at the college to better understand the ocean. In particular, I will focus on the ocean's impact and response to the changing climate.

In Development

E. Howard Rutherford, Director of Development

The College of Marine Science's (CMS) graduate students never cease to amaze me. Not sure why I should find myself surprised by this as I have been interacting with CMS students for close to twenty-five years now. The passion they exude for their respective disciplines is clearly demonstrated through their excitement and enthusiasm when given the opportunity to share their work with various audiences at USF and beyond, especially donors and friends to CMS. Maybe what I am trying to say is that I am amazed by how our graduate students are able to leverage minimal available resources to achieve innovative results. Erin Symonds, Ph.D. candidate and current Knight Fellow, is a perfect example.

Prior to university budget cuts in 2014, the USF graduate school awarded $5,000 Research Challenge Grants to promote interdisciplinary collaborations among USF graduate students. Erin and three fellow colleagues within the College of Engineering and the College of Arts and Sciences were awarded one of the last Research Challenge Grants to execute a rapid assessment of microbial risk from consuming lettuce in the Cochabamba Valley of Bolivia. By leveraging existing research grants awarded to their major professors, the graduate student research team was able to fund their analytical research expenses as well as travel to Bolivia to produce highly quality, interdisciplinary, and innovative research. Their work has been presented at several national professional conferences and a related article was recently submitted for publication in Environmental Science and Technology (it is currently undergoing peer-review). Additionally, two of the team members who graduated in 2014 have successfully acquired tenure-track professorships. Their research experience and achievements at USF were considered one of their most highly regarded accomplishments.

How wonderful it would be if CMS could support additional graduate research opportunities for current and/or future students similar to Erin's experience through an endowment. Now we can!

Thanks to the generosity of Drs. Peter and Susan Betzer, CMS will be able to support graduate student research and educational activities within the college through a planned gift. The Peter & Susan Betzer Innovation Fund for Marine Science endowment will ensure that our graduate students have the support needed to be successful for generations to come. As a result, CMS will continue to be able to attract and retain the best and the brightest graduate students.

Through a planned gift, you too, have the unique opportunity to support CMS's amazing students and faculty in perpetuity. Please contact me if you would like to learn more about how you can make a long-term impact on our graduate students, faculty and programs- 727.553.3376 or hrutherford@usf.edu

College News

Faculty and graduate students from the University of South Florida's College of Marine Science took a major role in the 2016 Gulf of Mexico Oil Spill and Ecosystem Science Conference held in Tampa Feb. 1- 4, 2016 at the Marriott Tampa Waterside Hotel, 700 S. Florida Avenue.

The international conference aims to bring together hundreds of oil spill experts representing academia, state and federal agencies, as well as non-governmental organizations and industry who will share the latest oil spill and ecosystem scientific discoveries, innovations and policies. Many of the results from 2015's summer research was presented.

5th International Clumped Isotope Workshop BEST GROUP INTERIOR DESIGNERS

The College of Marine Science hosted the 5th International Clumped Isotope Workshop.

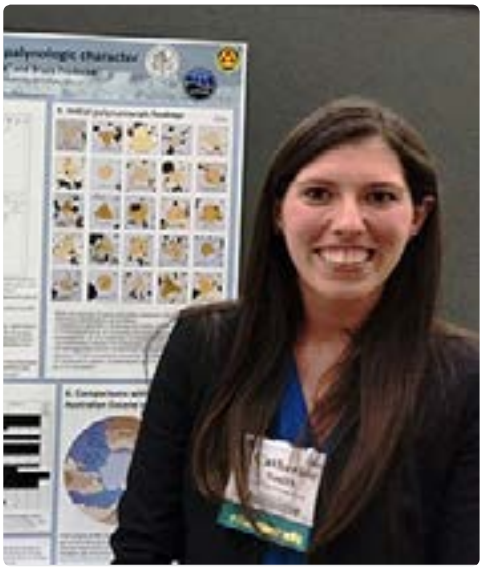
Ryan Venturelli presents her research on clumped isotopes during a poster session

The Knight Oceanographic Research Center and Dr. Robert Ulrich from the College of Marine Science was recently interviewed by WUSF, regarding a dangerous bacteria that lives in the warm summer waters of Tampa Bay, Florida and the southern U.S. It is a public health problem few have heard about.

The 2015 University of South Florida College of Marine Science Graduate Student Fellowship Award Luncheon took place on October 9, 2015 at the Staybridge Suites in St. Petersburg, Fl. The college celebrated the excellence of their graduate students through the award of their endowed fellowships. These endowed fellowships are a point of pride for the college and reflect years of successful engagement with the community.

USF Giving Tuesday 2015

On December 1, 2015 we will celebrate #GivingTuesday, a global day dedicated to giving back. The University of South Florida College of Marine Science will proudly participate in #GivingTuesday by joining a vast network of organizations and individuals who have come together to transform the way people think about, talk about and participate in the giving season. We invite you to join us and give thanks to the Ocean!



Catherine Smith has been awarded the "Best Student Poster" award at the recent Geological Society of America-AASP-TSP joint Annual Meeting, this by the AASP-TSP (American Association of Stratigraphic Palynologists-The Palynological Society).

Note to CMS Alumni

Albert (Al) C. Hine, Professor

Hello Alums of the USF Department and College of Marine Science. My message is short and to the point. We really want to provide connectivity to those of you who have graduated from our program. To do so, I really need:

Any news that you wish to pass on about your career. Believe it or not, your fellow alums would really like to know. We have people all over the globe, and it would be wonderful to know what some or all of you have been up to so we can brag to the upper administration (and to just about anyone else) how successful are grads have become over the years. So, send me one-liners, pics, citations of pubs, family events, promotions—you get the idea.

We want to know what your lives have been like so we can share it with others—and our present graduate students. They are most curious and slightly nervous about what lies ahead of them after they obtain their hard earned degrees. You guys can provide some guidance.

How we can make this form of communication better? We are just "following our noses" so to speak with Rising Tides. What are we missing? How can we communicate with our former grads more effectively? Please tell me.

We are thinking of a 50th anniversary bash for the Department/College of Marine Science. Yup, it started in 1967. So, if I can use my fingers and toes multiple times, the 50th will be 2017. We are thinking of the fall of that year. But what should we do to note the achievement? Suggestions? Ideas? A mass sky-dive over Bayboro Harbor?

So, there you go. I am at:

hine@usf.edu

Please send me stuff about you.

Featured Science Article

Revealing the Hidden Lives of Fish

Ernst B. Peebles, Associate Professor, College of Marine Science

Ernst B. Peebles

Most of the activities in my lab at CMS currently revolve around the concept of natural tracers (natural tags) and improving our general forensic ability to reconstruct the histories of individual fish. Natural tags are chemical in nature, and thus are fundamentally different from the artificial (manufactured) tags that have been traditionally used to study fish movement.

Natural vs. Artificial Tags

In many applications, natural tags have advantages over artificial tags. Artificial tags must be purchased and implanted in large numbers of fish in order to collect a useful amount of information (most tags are never seen again), whereas every single fish contains usable natural tags. This distinction was particularly noticeable after the Deepwater Horizon blowout, when people realized that few fish in the affected area had been fitted with artificial tags. It was a realization that stimulated new interest in natural tags.

One problem with natural tags is that the information they contain is locked within the fish, and expensive analytical instrumentation is required to access it. And once the information has been accessed, the researcher must also know how to interpret it. The use of natural tags thus has a steep learning curve and a high cost of entry. At CMS we are training the next generation of resource scientists how to best use these new methods. The analytical instruments required are commonly available at research universities around the

Young dolphinfish after implantation of an artificial tag that has a unique code printed on it. The researcher knows the initial tagging location and some information about the fish (length, weight, and possibly its sex). If the fish is recaptured and reported (most are not), then the same type of information can be obtained for one or more additional locations (E. Peebles photo).

Another advantage of natural tags is that they often reside in parts of the fish that have no economic value. Fish heads, which are usually discarded as waste, contain two types of natural-tag recorders: otoliths and eye lenses. Otoliths are often called “ear stones” because they are more similar to stone than bone. The resemblance to stone comes from the dominance of calcium carbonate minerals, which are the same principal constituents as in limestone. Bone, on the other hand, has a much higher non-mineral (organic) content. Functionally, otoliths assist with hearing and allow fish to maintain balance and orientation in three-dimensional space. Otoliths grow in layers as the fish grows. Fisheries scientists have been looking at otolith layers for decades to determine the age of individual fish. Otoliths can be read in the same manner as tree rings, except considerably more skill and experience is often required to read them. Knowing both the age and the size of a fish allows calculation of growth rate at different times during life, which is an important indicator of the health and vitality of the fish under study.

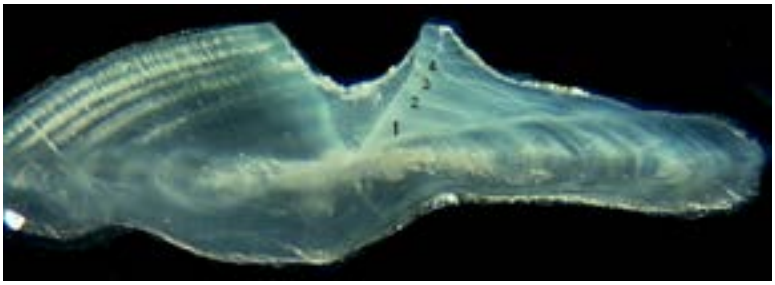
Featured Science Article

Revealing the Hidden Lives of Fish

Ernst B. Peebles, Associate Professor, College of Marine Science

Otoliths as Natural Tags

In addition to providing age and growth information, otoliths contain chemical impurities that become locked into the crystalline mineral structure of otoliths as they grow. Otoliths grow by precipitation of dissolved materials onto the otolith surface. The location and rate of this precipitation is controlled by a very thin protein layer on the surface of the otolith, and also by fine-scale control of the acidity of the fluid that surrounds the otolith within the skull of the fish. Although the otolith precipitation rate is controlled, chemical impurities nevertheless find their way into newly deposited layers. Some of these chemical impurities are internally regulated by the fish before deposition, but others reflect the outside environment. The presence of the element barium, for example, is an indicator of exposure to river water. We have found that Red Snapper from the north-central Gulf of Mexico tend to have variable amounts of barium throughout their otoliths, indicating variable exposure to river water throughout life. This contrasts with Red Snapper from west-central Florida that tend to have either very low barium throughout their otoliths or elevated barium near the center of their otoliths, a pattern that suggests movement from an origin in the north-central Gulf to west-central Florida later in life.



A cross-section of an otolith from a six-year-old Red Snapper (FWRI photo).

Barium is just one of twenty-five chemical elements that we measure within otoliths. To obtain this elemental information, we first cut and polish the otolith, and then use a powerful laser to precisely blast tiny particles from the surface of the polished otolith. The blasting is precise partly because we use a laser beam that is only about half the width of a human hair. After being dislodged from the otolith, the tiny particles float invisibly within a gas mixture that carries them to an analytical instrument (an ICP-MS). The ICP-MS tells us the abundance of the different elemental impurities at different locations within the otolith so that we can compare trends during the entire lifetime of the fish. This type of research, which is known as "otolith microchemistry," is conducted in cooperation with the highly skilled personnel of Dr. Byrne's lab at CMS.

At the time of the Deepwater Horizon blowout, our lab already had its otolith microchemistry apparatus up and running. We were using it to match older Gag grouper collected from open Gulf waters to various nursery habitats in shallow, nearshore waters. Soon after the blowout, fishermen and researchers started reporting the presence of fish with health abnormalities, notably open sores (lesions), and we started working with Dr. Murawski's lab at CMS to help determine the cause of these lesions. It has taken my doctoral student, Jen Granneman, years of painstaking work with literally millions of data points to determine whether there was a relationship between otolith microchemistry and the presence of lesions. There were many times when she convinced herself that she was on a wild goose chase, as researchers at other universities had tried to do the same thing she was attempting, but ultimately did not succeed. Then in late 2015, Jen's perseverance paid off; she was able to establish a very clear relationship between the presence of lesions and elevated nickel and zinc within otoliths. Nickel and zinc had already been identified as two of nine metals that were readily measurable in Macondo crude oil (the type of oil released by the blowout). Finding this strong relationship was gratifying, although at this point we still consider the evidence to be just one part of a larger weight-of-evidence that implies cause and effect.

Featured Science Article

Revealing the Hidden Lives of Fish

Ernst B. Peebles, Associate Professor, College of Marine Science

So far, our collective studies of otolith microchemistry have been used to identify broad-scale habitat proximity to major river discharges (Red Snapper), to match older fish in the Gulf to their nearshore nursery of origin (Gag grouper), and to identify nickel and zinc as indicators of oil exposure in fish (various species). These insights were made more useful by the fact that otoliths provide a built-in timeline for the process under investigation. What we still needed, though, was a more precise record of the fishes' geographic location during life. For example, if a lesioned fish from west-central Florida had high nickel and zinc in its otolith, we could determine when it was exposed to the nickel and zinc by reading its otoliths (like tree rings), but we would not have a very good idea of where it was exposed—was it exposed in local Florida waters or did it swim here from somewhere else? We needed a natural-tag method that would provide us with more information about the history of geographic movement by individual fish. Pursuing this objective would lead to our lab's most important discovery.

Eye Lenses as Natural Tags

The natural tracers that land-based researchers use to track animal migrations (movement of birds, butterflies, hoofed mammals, etc.) are called "stable isotopes." While the public is well aware that a given volume of lead weighs more than the same volume of aluminum, the public is much less aware that density also varies within many individual elements. The different densities of a particular element are known as its "isotopes," and the ones that are not radioactive are called "stable isotopes." Stable isotopes occur naturally and are entirely safe. The proportions of different stable isotopes that are present in a given setting or material reflect processes that have discriminated one isotopic density from another, sorting them into different bins, so to speak. There are many different processes that sort stable isotopes over space and time, and these processes are well understood, for the most part.

One outcome of all of this is geographic variability. Isotopes vary across both landscapes and seascapes, and can be drawn as a map just like other types of geographic information. These maps may have clear gradients or they may look like mosaics. The map for one isotope may look entirely different from the map for another because different processes are involved. Terrestrial biologists have taken advantage of these patterns in a simple way—if an individual animal matches its local isotopic landscape, then it must have been sitting still. If the animal contrasts with the isotopic background, then it must have moved, and maybe the researchers can match the moving individual to other locations on the isotopic landscape to figure out where it came from. Of course, there are other details that must be taken into account, but this is the basic idea.

In order for my lab to engage in this type of pursuit, we first needed to piggyback on an existing series of survey cruises in order to create isotope maps for the Gulf of Mexico, and then we needed some sort of internal record that could supply us with the isotopic histories of individual fish. Regarding the latter objective, otoliths are not a good candidate because they contain very little nitrogen, and we learned from the survey cruises that nitrogen isotopes produce predictable, repeatable gradients in the eastern Gulf of Mexico. These robust, nitrogen-isotope gradients were potentially very useful, provided we could find isotopic records for nitrogen somewhere within the fish's body. We tested vertebrae from king mackerel first, but found uniform nitrogen isotopic composition throughout the vertebrae, which is an indication that the vertebral bone tissue was being replaced over time in a process called "turnover." Turnover is possible because bone has a blood supply. Cartilage, on the other hand, does not have a blood supply, and so we looked at the vertebrae of cartilaginous fish (sharks) and found much better nitrogen isotope records, as had others before us who were looking for the same thing. Still, we wanted a means of obtaining individual isotopic records for all fish, not just cartilaginous ones.

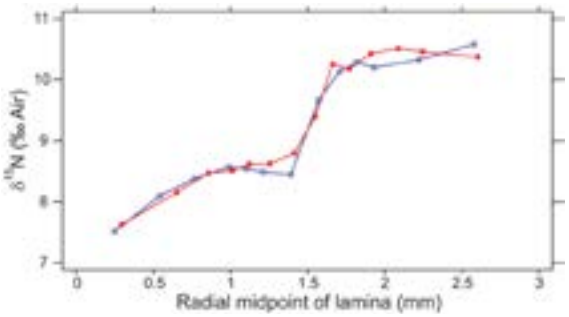
Featured Science Article

Revealing the Hidden Lives of Fish

Ernst B. Peebles, Associate Professor, College of Marine Science

Concentric layers (laminae) visible in a cross-section of a fish eye lens (E. Peebles photo).

One day, it dawned on me that eye lenses might work. Eye lenses are constructed of concentric layers like an onion. The layers ("laminae") are made of protein instead of the calcium carbonate found in otoliths, which means the eye lenses contain plenty of carbon and nitrogen for isotopic analysis. The "onion" layers in the eye lens serve as time capsules, preserving time-specific isotopic information. This happens because the cellular machinery used to create new protein is later removed from each layer to improve its optical clarity—the manufacture of new protein becomes impossible without this cellular machinery, and so the only proteins present in each layer are proteins that were produced at the time of layer formation (there is no blood supply, no new protein production, and no turnover). This process continues throughout life, creating a lifetime isotopic record for the fish—finding these isotope records hidden within eye lenses was quite an exciting finding.



Lifetime nitrogen-isotope history of a White Grunt, compared using data from left (blue) and right (red) eyes (Wallace et al. 2014, Stable isotopes in fish eye lenses as potential recorders of trophic and geographic history, PLoS One DOI: 10.1371/ journal.pone.0108935).

Students and the Future

CMS students have been an integral part of these investigations all along, and they greatly enjoy the excitement of scientific discovery. They conduct the lion's share of the lab work, and then we analyze the results jointly. The joint analysis usually involves consultation with Dr. Hollander and his personnel from the stable-isotope lab at CMS. The students do a great job of presenting their results at professional meetings—several have been recognized with awards.

We have a growing list of new objectives for these methods. One is to simply combine otolith microchemistry with eye-lens isotopes (another first), which should substantially enhance our powers of interpretation. We are also investigating "missing" periods in the lives of fish, shedding light on life stages and spawning locations that are poorly or completely unknown.

Featured Alumni

Don Eggimann, College of Marine Science - DMS MS 1975

Don Eggimann in his office.

In 1972, I was fortunate to become a student at DMS and meet the most influential people of my life: Dr. Tom Pile, Dr. Ken Carter, Dr. Kent Fanning, and my major professor and mentor, Dr. Peter Betzer. The experiences that followed and the lessons learned were most memorable: A first trip to Africa aboard R/V Trident where I tasted my first "twanger" (a Betzer named Barbados rum drink) while watching a Sahara Dust enhanced sunset off the stern. I remember the constant hum of Dr. Bob Duce's (URI) Electolux vacuum cleaner sucking up as much dust as his filters could hold. That began my life sampling nepheloid layers with Niskin bottles and sediment traps and later analyzing it, publishing it, and then enjoying the grants that allowed you to do it all over again.

After graduation in 1975, it was decision time. The college was planning a PhD program, but it wasn't yet approved. Although still working for Dr. Betzer and enjoying every minute of it, I was at a crossroads: continue my education in Oceanography or seek something outside the university. My decision was made with an offer to join Honeywell in the development of the Space Shuttle and strategic missile guidance and navigation systems. What did that have to do with Oceanography? Nothing. Except that the applied science preparation I received at DMS, by undoubtedly the best educators in the country, was well suited for what the space industry needed.

The next several years were truly inspirational. Working as a Materials and Process Engineer, I helped with the successful build to launch Space Shuttle Columbia STS -1 in early 1981. Next, I was promoted to Design Engineer and worked in the floatation fluid design used in the highly accurate guidance systems in the Trident, Poseidon, Minuteman, and Missile X. The best of this job was being designated Honeywell technical representative and working with avionics scientists at the Charles Stark Draper Lab at MIT. I must credit my time at DMS in laboratory and research cruise applications for preparing me for these challenges.

In 1984, I had the good fortune of meeting an industry entrepreneur, Mr. Harry Barkett, who much reminded me of my major professor and mentor at USF. Like Dr. Peter Betzer, he had the uncanny ability to see beyond the limits of normal folks. My career was set to make another major turn. Soon Mr. Barkett hired me as his Director of Research, and immediately we were developing chemicals for the microelectronics industry, a self-sustainable hydroponic/aquaculture system, and a highly efficient environmental control system for aircraft. Those years were totally exciting and profitable because we applied good common sense to very technical applications. However, with such varied daily responsibilities, it was often hard to describe and have my family and friends believe this was how I was earning a living.

In 1988, Mr. Barkett asked me to take over the reins of the technical department and accept the challenges of helping build a fledgling petroleum blending and packaging company in the Port of Tampa. Later to be known as Amalie Oil Company, we had much work to do. The first task was to expand the capability and expertise in the quality control laboratory. Part of this effort was the application of computer modeling techniques to handle laboratory data and to design and predict the formulations of advanced lubricants. The day to day challenges and hard work to build and expand the technical needs of a large company made the next 25 years seem to fly by. I know we were successful, as this company is now more than twenty times in size and production volume than when we started. It continues to grow today and is the largest of its kind in the nation. Most locally know the company for our sponsorship of the Amalie Arena. I officially retired from my management duties at Amalie in July of 2012, but with good fortune remain connected as a consultant/mentor to this good family owned company. Now I have more time for my grandkids and golf.

Featured Alumni

James (Jim) Acker, College of Marine Science - DMS-PhD 1988

Jim in his office at the GES DISC in Maryland

Post-degree from the Department of Marine Science at USF, I did a post-doc at the U.S. Geological Survey and a year with them doing watershed research in the Catoctin Mountains of Maryland. I was then fortunate to find a contractor position at NASA Goddard Space Flight Center, originally as "Oceanographic Liaison" for the Earth Observing System. As that program evolved, my tasks (a contractor term) did as well – I eventually led user support for Sea-viewing Wide Field-of-view Sensor (SeaWiFS) data at the Goddard Distributed Active Archive Center (DAAC) starting about a year before SeaWiFS launched. (SeaWiFS was a long-awaited ocean color satellite mission originally scheduled to launch in 1993 and finally reaching space in 1997.) While supporting data users around the world, I used the data to look at storm-driven offshore transport of shallow carbonate sediments from reefs and banks (even collaborating with Al Hine on a paper) and also to investigate the northern Red Sea, where SeaWiFS observed a short spring bloom and serendipitously confirmed a circulation model for the northern Red Sea basin. At the same time, I indulged my enjoyment of science writing by writing a series of articles for the Web about principles of ocean color remote sensing and some of the "cool" observations made from space, which are still available online – search for "ocean color" together with "science focus" to find them.

Only a couple of years after SeaWiFS finally orbited, my wife Dorothy and I embarked on the adventure of family life. We launched quickly, with twins born in late October 1999, a boy (Ben) and girl (Audrey), and a month later completing the adoption of an 11-month old daughter from China (Natalie). They're all in high school now trying to figure out where to go to college. The reason for my interest in carbonate sediment transport observations from space stemmed from my thesis research with Bob Byrne and Pete Betzer. At USF, I studied the dissolution of aragonitic pteropod shells in the deep ocean, using pH electrodes and then pH-sensitive dyes as Bob developed the now widely-used technique. We attempted to estimate the contribution of pteropods to the ocean carbonate budget using sediment traps, but that attempt was somewhat complicated by the fact that pteropods are active swimmers (just like myself and Pete). Still, we found signs of dissolution on sinking pteropods, the first time that had ever been seen. The reason for considering shallow carbonate sediments is that they can be partially composed of aragonite and also magnesian calcite, which is even more soluble in seawater than aragonite. Since pteropods have become the canaries in the coal mine of ocean acidification, I think it's still an important research topic to pursue.

A few years ago, aided by my experience with the ocean color missions and my writing portfolio, I was funded by NASA's Science and History divisions to write a history of NASA's leading efforts in ocean color remote sensing. The book was published this year, entitled The Color of the Atmosphere with the Ocean Below: A History of NASA's Ocean Color Missions. The history benefited, in part, from a meeting hosted at USF where about thirty individuals involved with the missions discussed them, as notes were taken and live recordings made. The amount of material gathered in two days at USF deeply enriched the resulting book. Fortunately there's also a future and not just a history: in addition to the out-of-warranty Moderate Resolution Imaging Spectroradiometer (MODIS) on the Aqua satellite, NASA has a newer ocean color instrument in orbit, the Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi National Polar-Orbiting Partnership (Suomi NPP) satellite, and will also get ocean color data from a sensor on a European mission (Sentinel-3) that is close to launch. Data from those missions is planned to accompany SeaWiFS and MODIS data in Giovanni. The next NASA ocean color mission, the Pre-Aerosol, Clouds, and ocean Ecosystem (PACE) mission, launch date sometime in 2022 or 2023.

Featured Alumni

Eric Wright, College of Marine Science - PhD 1995

Eric Wright cutting a recently taken core with students in South Carolina

Growing up in a small college town, I wanted to become a college professor of mathematics. While I did not think so at the time, I fortuitously placed out of one semester of introductory biology and had to take another course to fill out my first semester college schedule. And so, I found geology (as well as that mathematical proofs were not my thing). Subsequent classes and field trips to the coast with Bill Fox started me in coastal geology and I was lucky to be able to continue under Orrin Pilkey at Duke University. With my Masters nearly done, I followed Lynn Leonard and Tonya Clayton and migrated south from North Carolina to St Pete.

I look back fondly on my years in St. Pete. I truly enjoyed being part of the group studying Florida's marsh coast, including amongst others Al Hine, Lynn, Steve Goodbred and Nate Wood. We had fun both in the field and lab, and our most challenging field days make good stories to tell my students today. Building on Al's work, my PhD focused on the Suwannee delta, the only larger, non-exclusively spring-fed river entering this coastline. While working on the project, I learned about vibracoring, geophysical collection and tying a bowline knot– all significant to my future studies. Nearly graduated from USF (I think there is a pattern here), I was accepted as a post-doctoral fellow at the Smithsonian Museum of Natural History as part of Dan Stanley's delta program. While at the Smithsonian, I studied the sedimentology of two deltas in Veracruz, Mexico. My field work in Mexico happily allowed me to avoid the freezing rain of a Washington, DC winter. But the earlier government lockout froze my access to laser printers and the ability to print the final copies of my dissertation - luckily, Steve had moved on from USF to a nearby university. After a year at the Smithsonian, I was offered a tenure track position at Coastal Carolina University (CCU), a regional university located outside Myrtle Beach, South Carolina. CCU's focus on undergraduate teaching was a great fit. I particularly appreciate the proximity to the coast and the ability to involve students in field based course projects. My research has moved from offshore and the marsh coasts of my graduate work to the sandy coast and inland coastal plain of South Carolina. As part of the SC Sea Grant/USGS Coastal Erosion Cooperative, I used ground penetrating radar and coring to study the evolution of the local barrier islands and coastlines. I've also had an interest in Carolina bays, paleo-inland dunes and most recently relative sea level and paleo-coastal plain shorelines. The nice thing about these studies and techniques is the ease of involving students in independent undergraduate research. While at CCU, I also served as chair during a period of growth from 550 to 800 majors in our program and I certainly learned a lot about running a large department (as well as about paperwork and people). I am happy to have returned to being a faculty member with primary duties of teaching and research.

CMS Alumni Tidbits

Lee Kump, CMS PhD, 1986, has been selected to be an American Geophysical Union Fellow. This is a huge honor, he is our first graduate to receive it. Only has about 0.01% of AGU's membership (n~60,000) are Fellows.

Monica Wilson, a recent graduate of the University of South Florida, has been chosen to be Florida Sea Grant's new Gulf oil spill research extension specialist. While serving in this position, she hopes to translate relevant oil spill science to Gulf Coast residents and stakeholders.

Featured Alumni

Kelley Anderson Tagarino, College of Marine Science - MS 2008

Talofa from Samoa! My husband and I are blessed to live on the water with nice coral reefs surrounding us.

Talofa from American Samoa! American Samoa, in case you don't know, is a tiny US territory in the South Pacific, home to gorgeous reefs, stunning ridges, and warm, welcoming people. I, like many Americans, had never even heard of American Samoa - it wasn't until the 2008 International Coral Reef Symposium (ICRS), which I attended while finishing my Masters degree that I heard of it. At a field trip sponsored by ICRS, I learned about the annual coral bleaching that occurs in American Samoa, and was invited to join a pilot study attempting to reverse coral bleaching by cooling the reef water. I said yes, and went to American Samoa in 2009 and learned their branching Acroporids bleach only on the top of their branches each summer.

Better yet, we were able to watch the corals recover their color in less than 24 hours by cooling the water by one degree Celsius!

Having been born and raised in Florida, I never thought I would live outside Florida for too long, and yet here I am still in American Samoa where I moved shortly after graduating with a Masters from CMS under the wonderful guidance of Dr. Pam Hallock Muller. I am extremely fortunate to have had Pam as an advisor, she taught me much more than just oceanography, and now that I teach and mentor students I look back in amazement and wonder how she juggled so many grad students so well!

As I mentioned, when I first came to American Samoa in 2009, I was conducting coral bleaching research, and quickly branched out from there. In January of 2011 I began working at the American Samoa Community College as their Marine Science Coordinator, where I taught marine science classes, mentored student research projects, and many other tasks. When you live in a small place, you quickly learn to be a generalist, because any proposal with the words "ocean", "marine", or "fish" will be coming to you! I really enjoyed working for the college and developed lasting bonds with students, many who are now beginning to return after earning their bachelors off island, as our college only offers associate degrees.

In mid-2013, I switched positions, to my current position as faculty at the University Hawaii'i Sea Grant College Program, and I am based at the American Samoa Community College. I still teach, although it is only one course in fall and spring, however my new position allows me to leverage the University's resources to improve the Marine Science Program at the community college. My position is split between supporting the Marine Science Program and the Aquaculture Program, and in addition I am the Pacific Islands Ocean Observing System (PacIOOS) representative for American Samoa, so I am putting the skills Dr. Mark Luther taught me to good use! Working in American Samoa has been an incredibly rewarding experience, I have come to love the Pacific islands, cultures, and people. I now feel as if I have one foot in the Gulf of Mexico and one in the Pacific, which is further strengthened by my marriage to an amazing Filipino man who I met in American Samoa. I am blessed to have family in the Philippines, where family vacations include some of the best diving in the world! Living in American Samoa has taught me to relax, enjoy the simple things in life, never expect to get work done before food is eaten, kava has been drunk, and trust earned - which really, isn't so different than anywhere else in the end. If you have never been to the South Pacific, I highly recommend it. If you want to visit American Samoa or discuss collaboration, please contact me at KelleyAT@hawaii.edu. Any College of Marine Science friend or family is family to me.

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