The Oregon Institute of Marine Biology (OIMB) has a long tradition of community outreach, including grant-funded support for elementary school and community college science education. For over 25 years, OIMB provided a summer display of live animals for public viewing in a rustic open-air pavilion on its Charleston campus. Then, in 2007, in a community-planning meeting with the Oregon International Port of Coos Bay, the new Charleston Marine Life Center (CMLC) was conceived. Following years of fund-raising and construction, this new public museum and aquarium stands poised to open on the edge of the harbor at OIMB, in the shadow of a newly installed 10kW wind turbine that provides for its electrical needs. The new facility will welcome visitors while providing access to a classroom with living marine animals for K-12 classes.

At the front entrance, visitors view the 13-foot skull of a humpback whale. Inside the building are five separate galleries with educational displays that focus on coastal ecosystems, deep-water habitats, marine mammals, fisheries and animal diversity. Built-in and free-standing aquaria and touch tanks ranging in size from 100 to nearly 2000 gallons with flow-through seawater fresh from the ocean feature fishes, invertebrates, and algae from local waters. The marine mammal gallery features re-articulated skeletons of a killer whale and a 35-foot-long juvenile California gray whale, as well as smaller toothed whales, seals, sea lions, and sea otters. An exhibit on the evolution of whales includes fossil whale bones and replicas of fossil whales in the collections of the Museum of Natural and Cultural History.

In the Underwater Oregon Gallery, visitors view high-resolution video of the sea floor in Oregon’s territorial sea as well as life at active underwater volcanoes offshore. Visitors learn about the biology and conservation of commercially important species such as Dungeness crab, albacore tuna, salmon and oysters in an open-air gallery with a stunning view of the fishing industry in action. Replica artifacts developed in collaboration with local Native American tribes show traditional uses of marine resources.

The project helps teach visitors about marine life and supports OIMB missions of education, research, and outreach. Institute director Craig Young said “We are viewing this as something we can do to help the community. Many visitors come to the southern Oregon coast to see the natural wonders of a spectacular coast. If we can instill in both children and adults a greater appreciation and understanding of marine organisms and ecosystems, we will prepare citizens to be better stewards of the natural world.” Read more OIMB news at oimb.uoregon.edu.
GREETINGS AND SALUTATIONS

It is always a pleasure to share with you exciting news. Once again, we have had a successful year hiring new faculty. Aaron Galloway has already joined our department at the Oregon Institute of Marine Biology and Adam Miller will join us in December in the Institute of Neuroscience. The arrival of Aaron and Adam continues our recent rapid pace in growth: two more new faculty members to go along with the four who joined us last year.

We anticipate more growth in the number of faculty over the next few years. As the University of Oregon embarks on an effort to hire a significant number of new faculty members to go along with the four who joined us last year, Biology intends to be in the thick of this exciting transition. Indeed, our faculty are discussing how much growth we want in our department, and what areas of research we think will best move us forward into the future of life sciences research and education. Stay tuned for more news about ambitious, successful and inspiring young faculty who choose to join our department and university.

In addition to rewarding outcomes in searches for new faculty, many of our current faculty members have received recognition for their impressive research and teaching accomplishments. The listing of awards received by our professors make it clear that we continue to excel in very exciting ways.

And, of course our undergraduate and graduate students also excel and have been recognized for their achievements that include Barry Goldwater Fellowships and the ARCS Foundation (Achievement Rewards for College Scientists). We are all very proud to see our faculty and students receive so many different forms of recognition and I look forward to telling you about more of them in future newsletters.

Bruce Bowerman
bowerman@uoregon.edu

GOLDWATER SCHOLARSHIPS

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John Gillies

My introduction to research at the UO happened by chance. As a freshman taking general chemistry, I knew I wanted to try work in research but I did not know how to go about getting a position in a lab. During the Spring term my professor was Dr. Andrew Marcus and curiosity led me to explore his lab. The research done in the Marcus lab was fascinating and I met with him to discuss the possibility of working in his lab. That meeting, in turn, directed me to meeting other lab members, including postdoctoral researcher Wonbae Lee who would eventually become my mentor. Soon I was attending group meetings for the combined labs of professors Marcus and Peter von Hippel, who collaborate closely in their research endeavors. Once Spring term concluded, I stayed on to participate in the research during Summer session and began to conduct experiments. The research focus was studying the T4 bacteriophage single stranded binding protein, which is part of the protein machinery that replicated DNA. Single stranded binding proteins are important in this process because they protect DNA from damage as well as help organize other proteins along the DNA. The T4 bacteriophage protein I studied is also a good analog for the ones present in higher organisms, so it is a good system to study to learn about this important type of protein.

Receiving the Goldwater Scholarship has been a great honor for me. It is wonderful to have the research recognized, and I am so thankful to professors Marcus and von Hippel, Dr. Lee and all of the other people at the UO who have helped me along the way. From here I would like to continue conducting research in graduate school. Currently, I am considering whether a career in academia or in industry would be a better fit for me. I love conducting research. I also enjoy teaching and working with students, which I discovered working as a tutor for the chemistry department. These two factors steer me toward pursuing a career as a professor. However, I am also interested in doing medical and pharmacological research in industry because those results would be more immediately beneficial to people. Whichever way my career takes me though, I know this award will be a great benefit to finding a position I will like.

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Welcome New Researchers
Institute of Neuroscience and Marine Biology

Adam Miller

Even as a kid, Adam was fascinated with animal behavior. He spent his formative years hiking the mountains of Utah and Alaska while watching salmon jump up waterfalls, bears eat blueberries, and trying to avoid mosquitoes. But it wasn’t until college when he took courses in genetics and neuroscience that he got hooked on figuring out how the brain works.

Adam started research as an undergraduate when he tried to decipher the “language” of a particular type of lizard that does elaborate pushup displays to fight over territory and mates. This work led to the development of a robot that could “talk” with the lizards. After graduating from college, Adam studied neurons in the brain of the nematode, C. elegans, that allow the animal to crawl towards preferred environments like tasty food, and avoid other stimuli like high temperature. Using another relatively simple system, the fruit fly Drosophila melanogaster, Adam investigated the formation of the different types of neurons in the retina responsible for generating either “color” or “night” vision. These experiences cemented his interest in using model systems to decipher the fundamental principles underlying how genes build the nervous system.

Adam wanted to investigate how neurons wire together into specific neural circuits that underlie behavior. He turned to the vertebrate model zebrafish, Danio rerio, and focused on electrical synapses, which allow neurons to directly communicate with each other and are present in the nervous systems of all animals. Adam’s work identified the first genes that regulate the development of this important synapse type in vertebrates.

Adam’s research group at Oregon will focus on fundamental genetic principles that are required to wire the brain. The work will take advantage of genetics, microscopy, biochemistry, and neuronal physiology to understand how the brain generates behavior. This work will provide a basic framework for understanding neurogenetic disorders that disrupt normal brain wiring, such as autism. Welcome, Adam!

Aaron W. E. Galloway

Growing up in maritime southeast Alaska, Aaron got hooked on marine biology early. While working on a fishing boat for six summers, Aaron cleaned approximately 30 thousand salmon. Looking at stomach contents of all these wild creatures sparked a curiosity about ecology and food webs that never left him. Aaron’s first research project, on the spatial use of cougars and their ungulate prey, involved local students in the ecological research, while also more generally assessing the quality of citizen science data for use in research. Aaron then transitioned back to the ocean, working initially with predators, in field-based projects focused on behavior and trophic positioning of seals and sea lions. Aaron found his true calling in researching community ecology and trophic relationships among benthic invertebrates and primary producers such as macroalgae, phytoplankton, and seagrasses.

Primary producers perform an underappreciated global ecosystem service by synthesizing many complex molecules that all organisms require, including ‘essential’ omega-3 and omega-6 polyunsaturated fatty acids. Many of these essential fatty acids are commonly misappropriated as ‘fish oils’ in popular literature, but are actually produced by algae and plants before making their way through complex food webs to fish. Aaron studied the fatty acids of diverse algal and macrophyte taxa and contributed several key methodological advances to using fatty acids as ‘biomarkers’ for inference of invertebrate consumer diets in marine and freshwater food webs. Biomarkers, when paired with careful experimentation, are an important complementary tool available to the modern ecologist for unraveling mysteries about what basal resources are supporting food webs in the face of climate change, biological invasions, organism interactions, and fishery declines. Aaron’s current research foci are understanding the role of seaweeds in subsidizing deep subtidal food webs, quantitative biomarker-based modeling of invertebrate diet, dynamics of algal lipids and food quality, and under-ice ecology of lakes and high latitude oceans. Welcome, Aaron and family!

Kerry Joyce (spouse) and Eva Joyce (8 year old daughter) with Aaron Galloway at a colleague’s summer cottage in Finland during his first postdoc assignment.

NEWS

made groundbreaking contributions in developing the zebrafish as a molecular genetic model and in understanding the evolution of new gene functions in vertebrates. Read full announcement at genetics-gsa.org/media/releases/GSA_PR_20150115_BeadleAward.html

Professor Emeritus, George Carroll, Institute of Ecology and Evolution, earned the 2015 Distinguished Mycologist Award from the Mycological Society of America (MSA). This award is one of the highest honors bestowed by the society. It acknowledges the quantity, originality, and quality of published research as well as the degree of service made to the society and the mycological community in general. Read more at around.uoregon.edu/content/emeritus-professor-george-carroll-receives-distinguished-scientist-award

PhD students Lucas Nebert, Institute of Ecology and Evolution, and Keats Conley, Oregon Institute of Marine Biology, are winners of the Julie and Rocky Dixon Graduate Student Innovation Award. This fellowship is for doctoral students who are interested in pursuing innovative experiences that will prepare them for careers outside of academia in areas including industry, business, and the nonprofit and government sectors.

Katja Kasimatis, Institute of Ecology and Evolution, received a first scholar award from the Portland chapter of Achievement Rewards for College Scientists. The award provides three years of support to a PhD candidate engaged in science, engineering, and medical research.

continued next page
Dan Thomas, Institute of Ecology and Evolution, won a Graduate Fellowship from the Mycological Society of America, along with an Alexopolus Mentor Travel Award and Forest Biology Research Award, also from the Mycological Society.

Keats Conley, Oregon Institute of Marine Biology, was awarded a Robert E. Malouf Marine Studies Scholarship. The Malouf Scholarship is awarded to support graduate students who combine societally relevant research with education or public engagement.

The Clarence and Lucille Dunbar Scholarship, which recognizes high achieving undergraduate and graduate students, has named biology graduate students Terra Heibert and Lisa May as recipients.

Laurel Hiebert, Oregon Institute of Marine Biology, earned support from the Marthe E. Smith Memorial Science Scholarship.

PhD students Ashley Bateman and Kyle Meyer, Institute of Ecology and Evolution, are recipients of the William R. Sistrom Memorial Scholarship established to recognize biology graduate students who exhibit academic excellence in working with microbiology or a closely related field.

**Keats Conley**

Keats in the Ariake Sea, Japan, holding Rhopilema esculentum, an edible species of jellyfish.

Image at top of page: Kelp-encrusting bryozoan Membranipora membranacea by Keats Conley.

A high school dropout from landlocked Idaho, I am perhaps one of the more improbable candidates to be working on a PhD in marine biology. Yet, here I am in an office on Onyx Bridge, in the lab with the jellyfish blazoned on the door.

I grew up on the Sagebrush Ocean of southern Idaho, 500 miles from the Pacific. Despite this, or because of it, I have always had a fondness for the sea. In college, my passions were split between science and poetry, and eventually I pursued a bachelor’s degree in environmental studies, which allowed me to pursue a bit of each. Upon graduating, I was accepted into the master’s program in environmental studies at the UO. The summer before beginning the program, I read *Oceana*, a book by ocean activist Ted Danson, in which he writes, “Experts say we’re within a century—possibly even less—of inhabiting a world where the only viable seafood left in the oceans will be jellyfish.” This quote—hyperbole, I later learned—haunted me. Upon arriving in Eugene, I was determined to research jellyfish. (Although, at the time, I could have told you more about jellybeans than jellyfish: fruit-flavored, kidney-shaped, Ronald Reagan’s favorite). In the most fortunate coincidence of my career, just as I began graduate school, the university hired a new professor, Kelly Sutherland, who specialized in gelatinous zooplankton. Equally fortuitous, she agreed to serve as my advisor. With her guidance, I gained a deep appreciation—even admiration—for the resilience and simplicity of jellies. These organisms endlessly awe me, pulsing persistently, brainlessly, since the Precambrian.

My doctoral work has shifted from “true jellyfish” (phylum Cnidaria, class Scyphozoa) to another gelatinous organism: appendicularians (phylum Chordata, class Appendicularia). Appendicularians are unique in their ability to feed on particles 10,000 times smaller than themselves—down to bacteria. This is unusual; most predator-prey ratios are around ten-to-one. As a consequence, appendicularians are an important link between bacteria and higher trophic levels. I currently research how appendicularians feed. Our research seeks to answer, essentially, whether there are mechanisms that allow these organisms to be “picky eaters,” and if so, to elucidate how this selection process occurs at the feeding-filter level. Selective feeding can have profound ecological impacts on the size and composition of the marine prey field.

Thus far, my work with gelatinous zooplankton has taken me to Japan, France, and, most recently, Israel. But most days you can still find me in the corner office on the fourth floor of Onyx Bridge, feeling fortunate to be a member of the lab with the jellyfish blazoned on the door.

**Conley is a doctoral candidate in Kelly Sutherland’s lab through the Oregon Institute of Marine Biology.**
Isabelle Straka

I remember my first day at the University of Oregon like it was yesterday. It began with Deborah Exton’s general chemistry lab. Having graduated from an elementary school of 30 students, a middle school of 80, and a high school of 225, this single class was larger than all of my previous schools combined. Panic set in as I looked around me—my fellow students were already whispering about GPAs, medical school applications, and extracurricular activities. No sooner had I arrived than I found myself bolting from the lecture hall before class had even begun.

In that moment of panic, I questioned everything. Did I belong here? Could I succeed? Ultimately, I decided to postpone the chemistry sequence until my second year and enrolled in my first biology course at the UO. It was during my spring term that year that I took Biology 212. This class was notorious on campus for being one of the most difficult and demanding that biology majors were required to take. As the term progressed, I found that gene constructs, action potentials, and transpiration experiments became my life. I was accustomed to succeeding academically until this point, but not without the help of a group of charismatic, determined, and intimidatingly intelligent group of individuals, that I found my place at the UO. In the years that followed, this group of people, led by instructor Mark Carrier, became nothing short of my family.

With every passing year my love for the university and for Eugene grew exponentially. I came full circle from an overwhelmed freshman bolting from chemistry lab to a proud biology major and chemistry minor, ready to tackle any challenge that was placed before me. I joined and competed for the UO Equestrian Team, took a research-based neotropical ecology class in Ecuador, adopted a dog from the Portland Humane Society, and discovered my unequivocal passion for winemaking. It was this passion for viticulture and enology that led me to complete harvest internships at Schramsberg Vineyards. I currently work at Château LaTour Martillac in the Pessac-Léognan region of Bordeaux, France, where I will complete yet another harvest internship at Schramsberg Vineyards.

Iowe everything I have achieved thus far to the unwavering support of my incredible family, professors, friends, and colleagues. As I turned in my final exam, I knew then that I wanted to become a teaching assistant and help future students just as I had been helped. For the three years that followed, I became a part of the Biology 212 TA staff. It was here, among a group of charismatic, determined, and intimidatingly intelligent group of individuals, that I found my place at the UO. In the years that followed, this group of people, led by instructor Mark Carrier, became nothing short of my family.

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GRADUATE EVOLUTIONARY BIOLOGY AND ECOLOGY STUDENTS

GrEBES

In 2008, a cohort of graduate students established a student organization to enhance the graduate school experience for students in the Institute of Ecology and Evolution. This organization of students became GrEBES (Graduate Evolutionary Biology and Ecology Students), a recognized student organization of the Associated Students of the University of Oregon.

GrEBES has several major goals that it achieves through a handful of well-honed annual activities. To enhance graduate student communication and relationships with the other graduate students, including the biology faculty and the Graduate Teaching Fellows Federation, GrEBES holds meetings throughout the academic year and hosts both an annual winter retreat and a fall “welcome back” barbecue. GrEBES also encourages academic leadership among biology graduate students by hosting seminar speakers in ecology and evolutionary biology, subsidizing student research and travel to scientific meetings, and providing research funds for undergraduate research projects under GrEBES mentorship. During the 2014–15 academic year, GrEBES presented $2,800 worth of travel and research awards to graduate students in the Institute of Ecology and Evolution. In addition, GrEBES granted four $500 “UnderGrEBES” awards to undergraduates in the Bohannan, Green, Streisfeld, and Roy labs. GrEBES also provides undergraduates with career-building advice through a series of informal workshops to advise students considering graduate degrees in the life sciences.

In its capstone event, GrEBES stays in contact with the larger university and Eugene-Springfield communities by organizing an annual free and public spring seminar series to communicate the latest scientific breakthroughs to a general audience by bringing world-renowned researchers to Eugene. These past seminars included “The Individual in the Genomic Era,” “Microbes and the Modern World,” “Astrobiology: Life at the Limits,” and “Oceans: Fathoms Unexplored.” These seminars are filmed and posted on the UO Channel at media.uoregon.edu.

This spring term GrEBES will be holding their fifth annual seminar series focusing on de-extinction with world-renowned paleontologist Dr. Jack Horner, director of the McMaster Ancient DNA Centre, Dr Hendrik Poinar, and leading bioethicist Dr. Hank Greely set to give lectures. More information is available on the GrEBES website, grebesuo.wordpress.com.

Growing up with a father who taught middle school science, I was exposed to the beauty of science at a young age. However, I did not develop my own passion for science until I entered high school. During my junior year, I enrolled in an Honors Research Science Class where I had my first opportunity to design and perform my own experiments and conduct research. My work on microplastics won first place at the Intel Northwest Science Expo. The opportunity to conduct independent research as a high school student inspired me to pursue science research in college.

In my first biology class at the UO, I applied for a position in a research lab on campus and was soon working in Dr. Jessica Green’s microbiology lab where research focuses on microbes all around us—in the built environment, on human skin, and in the atmosphere. This led me to finalize my research for my Biology Honors thesis on fungi in the atmosphere over Mt. Bachelor. While working alongside Ann Klein, a Ph.D. student, I applied molecular biological techniques and high-throughput DNA sequencing technology to analyze samples. I presented my findings on atmospheric fungi and earned a Barry Goldwater Scholarship. I am very honored to have been selected for this prestigious scholarship and to have my research recognized.

After graduation, I will work in biotechnology related to human health before pursuing a Ph.D. and continue my education in biomedical science. I can also see myself eventually conducting biomedical research at a university and teaching. Participating in real scientific research has solidified my desire to continue to pursue a career in science and help solve issues related to human health.

Kyla Martichuski
Can Germs Be Our Friends?

When most people talk about the challenges in science, they usually don’t include sneaking into the boys’ bathroom. But today, that is precisely the task facing members of the Biology and Built Environment Center (biobe.uoregon.edu).

The center investigates the microbial ecology in the spaces where we live—the built environment. People have been studying ecology and the way organisms relate to each other and their surroundings for centuries. But until recently, most ecologists focused on creatures in their natural habitats in the great outdoors. Now the field of indoor microbial ecology is starting to look at what kinds of microbes live in the buildings we inhabit.

The knee-jerk reaction to the idea that there are microbes (germs!) in our homes is to load up on antimicrobial hand soaps, and maybe even to embed flooring, paints, and other household products with antimicrobial chemicals. But no one has actually looked at the effect of all of those antimicrobial chemicals on indoor bacteria.

Some scientists are concerned that by constantly exposing the bacteria in our buildings to these chemicals, we might actually be increasing the spread of antibiotic resistance. Researchers have looked at what kinds of antimicrobial chemicals are present in buildings, because they know they can have serious negative effects on indoor air quality and human health. Others have looked at what kinds of bacteria are in buildings. But no one had put the two together. It seemed like an obvious next step.

Members of the center collected dust from the tops of bathroom stalls to extract bacteria and chemicals—and this dust is precious. It’s the key to finding out if there’s a link between antimicrobial chemicals and antibiotic resistance indoors. They scour the corners, the pipes under the sinks and behind the toilets, and the tops of the cubicles . . . and that’s just in the bathrooms. It takes days to go through the whole building.

The goal is to see whether the bacteria in dust have genes that make them resistant to the antimicrobial cleaning products we use to kill them—or even the antibiotics we use to treat infections.

Once dust is collected, it takes a small army to process the samples. Lab members work on DNA extraction and preparation, and then send it off to be sequenced by someone else. The same goes for the chemicals. In the end, this project will directly involve about 15 people from multiple disciplines including biology, architecture, chemistry, and public health.

And it is serious. The team is looking for reservoirs of antibiotic-resistant pathogens, germs that could land you in the hospital, infections for which we have no more cures. If they can find a particular source, one clue about the forces that increase antibiotic resistance, maybe they can use this discovery to help curb the spread of antibiotic resistance and preserve our arsenal of antibiotics, preventing the return of fatal infectious diseases. But first, they have to get into the boys’ bathroom.

This story is published courtesy of the Conversation.

Microbiology and Architecture

Microbiologist Jessica Green and Oregon architect Charlie Brown have been awarded a $1 million Environmental Protection Agency grant to study houses in Portland and Bend as they are weatherized over the next two years. Their collaborations with Brendan Bohannan (University of Oregon), Curtis Huttenhower (Harvard University), and Rolf Halden (Arizona State University) have resulted in more than $3 million in grants from the Alfred P. Sloan Foundation to investigate the relationship between architectural design and indoor microbiome.

Jessica Green, an associate professor in the Institute of Ecology and Evolution, is a Guggenheim fellow and the director of the Biology and the Built Environment Center. Visit her website at pages.uoregon.edu/green.
Teaching Aid is a site-specific collaboration between biologist Peter Wetherwax (Department of Biology), artist Carla Bengtson (Department of Art) and a colony of *Atta sexdens* leaf cutter ants at the Tiputini Biodiversity Station in the Ecuadorian Amazon. This is one of many art-science projects the team has realized while teaching the Department of Biology’s Neotropical Ecology Program, a summer study-abroad program in Ecuador.

In this tongue-in-cheek cultural exchange between species, the team introduced the ants to *Peterson’s Field Guide to Insects*. Both the *Guide* and cut-out paper insects were laid-out on the forest floor. The ants quickly and enthusiastically joined in to cut insects of their own. The ants exhibited distinct preference for Coleoptera, while ultimately rejecting Lepidoptera.