

COLLEGE OF SCIENCE DEPARTMENT OF INTEGRATIVE BIOLOGY

BIOVERSE

Ocean protection in a new era

WINTER 2020



Oregon State
University

BIOVERSE

Winter 2020

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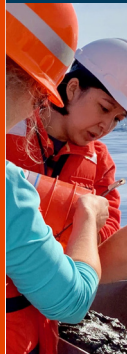
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On the cover — Lowtide at Otter Rock, one of many scenic sites along the Pacific coastline where faculty and students conduct marine health research (p. 8)



FROM THE HEAD



Greetings from Integrative Biology!

We have had another productive year in the department. First, I want to thank Bob Mason for his service as acting head in 2018 during my wonderful sabbatical in New Zealand and Florida. I returned in January 2019 and have decided to step down as head in June of 2020. I have served as head since 2011 and am eager to return to the faculty ranks where I plan to pursue solutions to the coral reef climate crisis and to return to teaching duties. The department is engaged in a search for a new head from within the department or OSU.

I'm delighted to share with you some very exciting news: Cordley Hall will undergo a \$158 million renovation starting next June. The 1960s-era

building is in desperate need of a complete overhaul. We have worked extensively with architects to plan a new space that will include state-of-the-art laboratory classroom space for undergraduate labs and modern faculty laboratories. It is going to be a long four years of transition, but at the end we will have a space worthy of our fantastic undergraduate and graduate students and our world-class faculty.

We have much to celebrate this year. In October, Megan Cook, B.S. Biology '09, was honored with the College of Science Young Alumni Award. Since graduating, her international career has spanned research, marine operations, media communication and ocean education. Several of our faculty received awards at University Day. Devon Quick and Lori Kayes shared the Student Learning and Success Teamwork Award with Dennis Bennett,

Director of the Writing Center. Lori Kayes also received the OSU Faculty Teaching Excellence Award. Andrew Blaustein won the Richard M. Bressler Senior Faculty Teaching Award. Finally, I was very honored to be named OSU Distinguished Professor, the highest honor given to faculty at OSU. I am lucky to join three other Distinguished Professors in our department, Jane Lubchenco, Bruce Menge and Andrew Blaustein.

We remain so grateful to our alumni and friends who continue to support our teaching and research mission. Read more in this newsletter of the successes of our alumni and the impacts that your gifts are making. Please stay in touch or reconnect with Integrative Biology! As always, we love hearing from you.

Virginia Weis
Department Head

Sophia Bethel



Ashley Victor



BRIGHT MINDS, BOLD MOVES

Our Undergraduates

Biology junior **Sophia Bethel** says she felt a lot of stress freshman year because she hadn't nailed down career goals. Happily, mentors in and out of the College of Science helped her understand that she didn't need an exact plan, that "in fact, it's often better not to because it can limit exploration, which is what your undergraduate degree is all about."

Bethel's exploration soon involved getting a seat in the Freitag Lab, where she worked over two years to improve the selection for mutants defective in transcriptional silencing in the fungal strain *Fusarium graminearum*, and presented a research poster on her work at the Center for Genome Research and Biocomputing Spring Conference in 2017. Her research gave her "a plethora of skills and knowledge" that she wouldn't have learned in a traditional classroom setting.

She then enrolled in the Scientific Professional Pursuits Program (SP3), a new, year-round course that focuses on professional development. SP3 opened her eyes to the many opportunities in STEM that go beyond technical research. She decided to explore the crossroads between science communication and marketing, and landed an internship at a biotech startup in Eugene. Today she is exploring biotech career options.

Presidential Scholar and honors zoology junior **Diana Fajer** has wanted to build a life around animals ever since spending hours at the Oregon Zoo as a child. Thanks to Oregon State's rare zoology major and in-state tuition, the university was the first and only choice for the Portland native. At OSU, Fajer has enjoyed a variety of beyond-the-classroom experiences, from an Honors College rafting trip on the McKenzie River to an "amazing" scuba diving class field trip in the Puget Sound where she

was "surrounded by jellyfish the whole way and even saw a small octopus!"

Fajer has engaged in many hands-on research experiences through the Honors College and the STEM Leaders Program. She researched amphibian ecology in the Blaustein Lab and human-animal interaction in the Udell Lab. "[I gained] serious critical thinking skills that I'll carry with me for the rest of my life," she shares. Pursuing three minors — in psychology, chemistry and professional sales — in addition to her zoology major, Fajer feels confident that she will have "a ton of career options available" after graduation.

Ashley Victor (Honors Biology '19) decided in high school that she wanted to be a pediatrician and so becoming a biology major with a pre-medicine option at OSU seemed a natural choice. Victor didn't anticipate, however, that she would fall in love with the breadth of biology. "I took

classes in genetics, biochemistry, ecology and evolution and just enjoyed learning everything,” she says.

Working in the nutrition laboratory of David Dallas in the School of Biological and Population Health Sciences and supported by a research grant from the Colleges of Public Health and Agricultural Sciences, Victor took the lead in analyzing alternative pasteurizing techniques in donor breast milk. Her research culminated in her Honors thesis and a published article. Victor was also one of 20 Peer Advisors in the College of Science and, as a mentor for Advocates for Women in Science, Engineering and Mathematics, she participated in OSU’s Pre-College Program through her science sorority Sigma Delta Omega. She mentored middle and high school girls by exposing them to campus life and engaging them in hands-on science experiments.

Victor is grateful to advisor Cody Duncan and other pre-med advisors — “They do a great job of demystifying the bewildering medical school process for students.” She is enrolled at Oregon Health and Science University, one of the top-ranked medical schools in the nation.

Biology senior **Kristofer Bauer** is the first recipient of the department’s Alexei Lubcheno Menge Undergraduate Research Fellowship, which supports one undergraduate each summer with a \$5,000 stipend and a \$500 research award to conduct ecological field research. Already a seasoned marine biology researcher, Bauer worked in four different labs during his undergraduate career. He spent two months aboard a research vessel tagging fin whales, blue whales and humpbacks off the coasts of Oregon and California. He also conducted genetic analysis of sea



Kristofer Bauer

stars, monitored species biodiversity in eelgrass beds, studied larval fish ecology and investigated marine invertebrates on rocky shores. He published his research on an intertidal predator with Felipe Barreto.

A lab technician in the Menge Lab, Bauer will use the fellowship for an independent field and lab research project on barnacle and mussel population dynamics and settlement in rocky intertidal habitats.

Biology boosts non-majors’ success

After their term project, students in **Nate Kirk’s** Principles of Biology honors class are tasked with creating a children’s book version of their research. Why? A student who can explain molecular phylogenetics to an eight-year-old is a student who truly understands the subject, according to Kirk. **Jordan Eaton’s** beautifully illustrated children’s book exploring the

BRAVE SPACES INCLUDE ALL

Over the last year the department has participated in several workshops and forums on increasing equity, justice and inclusion, including a half-day retreat last summer led by the Integrative Biology Graduate Student Association. Faculty, graduate students, post-docs, advisors and staff examined historical inequity and the systems of oppression that shape the field, with a focus on strategies and community-building efforts towards increasing participation and retention of underrepresented groups in STEM. We are grateful to the OSU Office of Institutional Diversity, Student Experiences and Engagement, the Social Justice Education Initiative and the College of Science for supporting our efforts to create braver spaces and engage in these difficult but important conversations.

relationships between amphibians and frogs in a relatable, compelling way, is a recent example of the many outstanding books that students have created in Kirk's class.

Undergraduate **Matthew Radin** attributes part of his success in attaining an internship with Forever Sabah, a non-profit operating in Malaysian Borneo, to his work digitizing bees for the Oregon Bee Atlas (see p. 11) as a curatorial assistant employed in the department's Oregon State Arthropod Collection. Matthew surveyed the dragonflies along a large river running through the indigenous Dunsan village of Kolosunan for two months and was enthralled by the wonderful and overwhelming biodiversity of tropical forests. "I encountered the largest beetles, spiders, butterflies and katydids I've ever seen, the largest ant in the world and the smallest dragonfly in the world, along with vipers, frogs, monkeys, orangutans, elephants, strange fishes and an entire universe of incredible jungle plants."



Andrea Burton

Our graduate students

Andrea Burton won a 2019-20 Fulbright Scholarship to teach English in Romania. The fourth-year biology doctoral student has already traveled extensively. As a member of the Peace Corps, Burton lived in Kenya and worked as a science and mathematics teacher at a secondary school for deaf and hard-of-hearing students. Along with her Kenyan colleagues, she developed a universal dictionary of science and math vocabulary for Kenyan Sign Language.

While working in the Meyer and Barreto Labs, Burton studies the genomic consequences of ocean acidification and elevated temperatures on commercially or ecologically important marine invertebrates, including Dungeness crab, abalone, oysters and sea stars.

After graduating with a degree in marine biology from Juniata College in Huntingdon, Pennsylvania, Burton earned an M.S. in marine biology at Northeastern University in Boston.

Passionate about teaching, Burton completed a Graduate Certificate in College and University Teaching last year. She is excited to combine her love for teaching and the outdoors as an English teacher in the beautiful natural settings of Romania. "As a biologist, I can provide some insight into the importance of nature and why we need to conserve it. Through this, students will broaden their English vocabulary and practice in a fun and engaging environment," says Burton.

Zechariah Meunier won a 2019 National Science Foundation Graduate Research Fellowship Program award to develop a mathematical model integrating the ecology and evolution of species in a community for better ecosystem management. Guided

by advisors Bruce Menge and Sally Hacker, Meunier investigates factors influencing the succession and stability of algae- and invertebrate-dominated communities at 13 rocky intertidal field sites across Oregon and Northern California.

Meunier graduated summa cum laude from Lawrence University in Appleton, Wisconsin, where he earned a B.A. in biology and environmental studies. He was awarded the Udall Environmental Scholarship and the Gilman International Scholarship, which took him to Madagascar to study climatic effects on tree phenology in Ranomafana National Park.

At OSU, Meunier won the Provost's Distinguished Graduate fellowship and was a co-author on a path-breaking study, along with biologists Jane Lubchenco, Kirsten Grorud-Colvert and other graduate students, that examined whether nations had met their pledges regarding the preservation of marine protected areas. The group presented their crucial findings at the annual Our Ocean Conference in Bali, Indonesia, and published the study in the *Marine Policy* journal.

Kamron Kayhani also won a 2019 NSF GRFP for his investigation of how mitochondrial adaptation affects organismal thermal tolerance using the intertidal copepod *Tigriopus californicus*. Guided by his advisor Felipe Barreto, Kayhani is working towards generating new insights about the ability of mitochondrial evolution to buffer organisms against rising temperatures associated with global climate change.

As a biology major at OSU, Kayhani engaged in extensive undergraduate research in several biology and ecology laboratories. These include studies on old-growth forest soils in agricultural

scientist Kate Lajtha's biogeochemistry lab and thermal tolerance in coral algal endosymbionts in the Meyer Lab.

An accomplished ballet dancer, Kayhani loves finding ways to integrate the arts into STEM education. Kayhani's identity as a queer individual and a second-generation Iranian American inspired him to get involved in several diversity-focused educational initiatives. He is a member of the department's newly formed committee on graduate equity, justice, and inclusivity, and he will focus on creating opportunities and resources for LGBTQ students and students of color to be successful in scientific careers.

Kayhani is also helping the Barreto Lab collaborate with OSU's chapter of the Louis Stokes Alliance for Minority Participation (LSAMP). Kayhani plans to work with LSAMP to develop workshops for students of underrepresented groups to gain laboratory skills via experiments in physiology and genetics, and by assisting in data collection and analysis within the area of his dissertation research.

Leah Segui (Ph.D. '19, Zoology), **Vanessa Constant**, Ph.D. candidate and **Katie Dzedzic** (Ph.D. '19, Zoology) are among only 69 finalists for the Sea Grant John A. Knauss Marine Policy Fellowship Program. This fall, the finalists traveled to Washington, D.C., to interview with several executive or legislative offices. Following placement, they will begin their fellowship in February 2020. As members of the 41st class of the fellowship, Segui, Constant and Dzedzic will join a group of over 1,300 professionals who have received hands-on experiences transferring science to policy and management through one-year appointments with federal government offices in Washington, D.C.



Zechariah Meunier



Jordan Eaton



Kamron Kayhani



Katie Dzedzic



Leah Segui



Matthew Radin



BRANCHING OUT: BIOLOGICAL LITERACY FOR ALL

Crew from the R/V Oceanus take researchers and students out to get a closer look at humpback whales around Heceta Bank.
Photo credit Tracy Crews

Top-notch pedagogy and research are hallmarks of our department, but reaching a broader audience is a vital part of our mission, as well. Advancing scientific literacy is critical, especially in an era of rapid climate change that requires informed, collective action on a global scale. Here is a sampling of how our faculty constantly strive to increase scientific literacy and the visibility of biological research both on campus and beyond.

National reach for online zoology

Our new, fully online zoology major program, launched last summer, allows anyone in the country to major in zoology at OSU. The only program of its kind in the country, the online zoology major offers interdisciplinary scientific training in all aspects of the biology of animals, from genes to ecosystems. “Students will learn from faculty who are nationally recognized in their teaching and research,” says marine

ecologist **Sally Hacker**, “but they will also be able to tailor their studies to meet their interests in animal biology through a series of elective courses.” All program coursework is delivered by OSU Ecampus, the university’s nationally renowned provider of online education. Ecampus is ranked No. 3 by U.S. News & World Report for online bachelor’s programs, its fifth consecutive year in the top 10.

Biology for non-majors

Entry-level, non-major biology courses expose Oregon State undergraduates who are pursuing other career paths to the core principles, methodologies and discoveries in biology. In just one of many examples, **Felipe Barreto’s** popular Introduction to Marine Biology course enables non-majors to understand how the ocean works – an important part of understanding climate change, the debate over commercial fisheries and overfishing, and ocean pollution. Each year, approximately 80 students who

complete Barreto’s course become marine-informed citizens who understand the need for large scale changes in how we treat our oceans.

It’s all in your DNA – or is it?

Dee Denver’s course Genomes, Identities, and Societies attracts a broad swath of students from across campus to probe the biological, social and historical complexities surrounding how genetic research has been used and applied in society, from its appropriation by the 1930s eugenics movement to its role in today’s identity politics. The course also explores how ethics are evolving to accommodate advances in genetic engineering and biotechnology. Readings for the course include many primary documents, including contemporary letters and historical material directly related to OSU’s teaching of human eugenics. The class also examines how DNA is portrayed in contemporary media and art. Last year’s class examined rapper Kendrick Lamar’s “DNA” from his



Sarah Henkel empties a sediment sample into a sieve for students to collect seafloor organisms.

Photo credit Tracy Crews

Pulitzer Prize-winning album “Damn.” Students engage in heated class discussions about how the history of mating science (even relatively recent history) shows that it is influenced, for better and worse, by broader cultural and sociopolitical norms.

All aboard for marine research

Sarah Henkel was the lead researcher on a cruise including high school and undergraduate students last September to conduct research at sea aboard the R/V Oceanus, a ship operated by Oregon State, along with Leigh Torres, a marine mammals scientist from Fisheries & Wildlife and Oregon Sea Grant Extension, and Jessica Porquez, a seabird-focused research assistant at Hatfield Marine Science Center. Students on board learned about marine-related careers, what it’s like to live and work at sea, and how to work as a research team. Students participated in Henkel’s ongoing research on the effects of renewable energy installations on sea creatures by collecting sediment and animals from the ocean floor for a future wave energy test site off the coast of Newport as well as at the

edge of the continental shelf. They also enjoyed a smorgasbord of other marine science research techniques, from collecting plankton to recording oceanographic data at different depths, and identifying and counting seabirds and marine mammals off the Oregon coast.

Ambassador for snakes – and science

Since 1982, snake expert **Bob Mason** has traveled to Manitoba, Canada for the annual mating ritual of the red-sided garter snake at the world-renowned Narcisse Snake Dens. The event, in which tens of thousands of snakes emerge from limestone dens to writhe in pits, form “balls” and mate for a few weeks each spring, is a popular tourist attraction, and an opportunity to spread science and delight. Mason brings OSU graduate students along and leads tours at the behest of local schools. “It’s amazing to me how many people want to see these snakes,” says Mason. “They are perfect ambassadors

for the reptile world.” Mason is currently working with a BBC film crew on an upcoming story about the snakes and was quoted extensively in the June 2019 New York Times article, “This Canadian Town Comes Alive Once a Year, as Thousands of Snakes Mate.”

Stepping up, speaking out

Distinguished Professor **Jane Lubchenco** joined forces with D. James Baker and Kathryn D. Sullivan, all former administrators of the National Oceanic and Atmospheric Administration (NOAA), to protest the Trump Administration’s political interference in the NOAA’s weather forecasting during last September’s Hurricane Dorian. The three co-authored an editorial, “We worked for the NOAA. Political appointees can’t overrule scientists,” that was published in the Washington Post. Lubchenco continues to be a model for scientists who are inspired to share a research-based perspective on issues of public concern (see p. 8).



Bob Mason and Ehren Bentz (Ph. D. '19, Integrative Biology) examine a garter snake.



MAKING WAVES: OCEAN PROTECTION IN A NEW ERA

“In creating a new solution space for the ocean, we can also address broader global problems. In healing the ocean, we can heal ourselves.” Jane Lubchenco

In a recent *Science* editorial, **Jane Lubchenco**, Distinguished Professor and world-renowned ocean ecologist, calls for a “new narrative for the ocean.”

“For most of human history, people considered the ocean so immense, bountiful, and resilient that it was

impossible to deplete or disrupt it,” she writes. But today’s cascading environmental problems — including climate change, overfishing, ocean acidification, coral bleaching and plastic pollution — have caused us to swing from viewing the ocean as “too big to fail” to “too big to fix.” The risk of such pessimism? “Depression and lack of engagement and motivation.”

Instead, Lubchenco calls for a “new ocean mindset” based on “powerful solutions [that] already exist and could

be scaled up,” from smart fishing to sustainable aquaculture, remote sensing, marine protected areas and more. Scientists can go beyond “simply documenting the tragedy underway” and join forces with the policy and business communities to enact “scalable solutions.”

Here at Oregon State, in tune with Lubchenco’s call, marine research has long catalyzed not just new understandings, but innovative solutions for ocean health.



Participants in OSU's Marine Science Media Fellowship visiting the Seal Rock Marine Reserve

A powerful conservation tool

Since 1997, **Jane Lubchenco** has worked on accelerating the large-scale adoption by all nations of Marine Protected Areas (MPAs), joined by **Kirsten Grorud-Colvert** in 2006. A proven conservation tool, MPAs can sustain and expand biodiversity and protect the genetic diversity needed for marine species to thrive despite the harmful effects of climate change and ocean acidification. A significant side benefit is the “bounty spill” of healthy juvenile and adult fish swimming across into adjacent, unprotected areas that suffer from depleted fish stocks.

A \$170K grant from the Kingfisher Foundation and a \$387K grant from the non-profit Oceans 5 enable Lubchenco and Grorud-Colvert to lead the international adoption of The MPA Guide, a cohesive resource for ocean protection. The grants enable two new postdocs, **Jenna Sullivan** and **Katherine Dziedzic** (both Ph.D. '19, Zoology) to join the project.

High-profile agencies and NGOs across the globe are partnering with OSU to sponsor The MPA Guide, including the United Nations Environment Program, the Marine Conservation Institute, and the National Geographic Society. The Guide will support the U.N. 2020 deadline to conserve 10% of the world's oceans in MPAs and inform discussions at major international conferences in 2020, including the World Conservation Congress of the International Union for Conservation of Nature and the Conference of the Parties for the Convention on Biological Diversity.

Bridging the gaps

Ocean-based actions have greater potential to fill gaps in climate change mitigation than previously appreciated, according to a paper published in Science by **Jane Lubchenco** and two collaborators. In connecting the dots between two new international reports on climate change, one highlighting its devastating impact on the ocean, the other analyzing ocean-

At the Our Ocean Conference in Bali, Indonesia, Jane Lubchenco, Kirsten Grorud-Colvert, Jenna Sullivan and Vanessa Constant presented the results of a project on global ocean protection led by OSU graduate students.



related solutions, the article was a key contributor to last September's International Climate Week.

“Ocean-based activities have significant potential to help us actually reach the 1.5 degrees Celsius target by 2050 – much greater potential than anyone realized,” said Lubchenco, who, along with 14 heads of state and 16-year-old Swedish activist Greta Thunberg, was one of the scheduled speakers at the press briefing “Blue Leaders: Call to Action on Ocean and Climate” in New York City on September 25.

Seeing is believing

Francis Chan is a pioneer not only in tracking how climate change is increasing both ocean acidification and hypoxia, or low oxygen zones, on the Pacific Coast, but also in sharing that data to effect positive change. Last year he produced a powerful outreach video that emphasized solutions to combat hypoxia's devastating effects on marine life, such as planting seagrass to absorb carbon dioxide and creating a

buffer to regulate the flow of ocean water through shellfish hatcheries. The video was shown at the Oregon Coastal Caucus Economic Summit, which drew nearly 700 political, business, academic and community leaders to Lincoln City, Oregon, in August 2018.

20 years of ocean health research

A special issue of *Oceanography* celebrating the 20th anniversary of PISCO, or Partnership for Interdisciplinary Studies of Coastal Oceans, features several articles by biology faculty, including a wonderful overview of PISCO's formation and accomplishments by one of the founding scientists, **Bruce Menge**. The issue is intended for a broad

audience including undergraduate and graduate students.

Over the last two decades, PISCO has coordinated investigations of West Coast marine ecosystems and made it a priority to rapidly communicate relevant science to policymakers and managers, as well as to educate new generations of interdisciplinary marine scientists. PISCO is led by Oregon State and includes three other core institutions, Stanford University, the University of California, Santa Cruz, and the University of California, Santa Barbara.

Bruce Menge, Francis Chan, Kirsten Grorud-Colvert and Jane Lubchenco were lead authors on several papers ranging from ocean acidification and hypoxia to the importance of long-term

research and connecting science to policymakers, managers and citizens. **Mark Novak** was a critical co-author on a number of articles along with program coordinator **Kristen Milligan**. The special anniversary PISCO edition of *Oceanography* is fully available online.

From the lab

Filtering out the blues

Zoologist **Jaga Giebultowicz** has discovered that daily, prolonged exposure to blue light, such as that which emanates from your phone, computer and household fixtures, may accelerate aging, even if it doesn't reach your eyes. The study, published in *Aging and Mechanisms of Disease*, involved the common fruit fly, which shares many cellular

Francis Chan speaks to visiting journalists and science writers as he works with a citizen scientist partner to service a sentinel sensor for tracking ocean pH changes on the Oregon Coast.



and developmental mechanisms with other animals and humans. Flies subjected to daily cycles of 12 hours in light and 12 hours in darkness had shorter lives, damaged retinal cells and brain neurons and impaired locomotion compared to flies kept in total darkness or in light with the blue wavelengths filtered out. Even mutant, eyeless flies displayed brain damage and locomotion impairments, suggesting the light was harmful even when unseen. Honors biology graduate **Trevor Nash** ('19) is the lead author on the study, a notable achievement.



Molly Burke

Following the scars

Molly Burke has received funding to probe the evolution of aging and reproduction in yeast cells. When yeast cells divide in half, they produce two daughter cells that are nearly identical to the mother cell except for a small scar. The Burke Lab has found a way to dye the scars and thereby select for long-living lines of yeast in order to study how the genes associated with longevity in the yeast genome evolve over generations.

Adapting to a coastal niche

How do organisms adapt to the incredible environmental variation to which they are exposed? **Felipe Barreto's** lab explores the ecological and evolutionary genetics of marine organisms, using a variety of tools that include physiological and biochemical experiments, molecular genetics, genomic sequencing, and bioinformatic analyses. The lab is particularly interested in how isolated populations of coastal species such as intertidal copepods and ochre sea stars adapt over time to a unique set of environmental variables (for example, temperature, salinity, oxygen, pH, diseases). A second focus of the lab is learning how reproductive behaviors are shaped by specific marine habitats.

Disease dynamics in bighorn sheep

Anna Jolles, Ben Dalziel and interdisciplinary collaborators from OSU and the United Kingdom, won a \$3.5M grant to study the relationship between the microbial biome and parasites across populations of wild desert bighorn sheep. The study uses innovative theoretical models and



Ben Dalziel

field research to examine the complex interactions between the microbiomes and parasite communities in sheep and the role they play in disease ecology across localized dense populations or herds, not unlike human populations.



Biodiversity data on pinned specimens in IB's insect collection provides the historical basis for the Oregon Bee Atlas.

Passion for Pollinators

Christopher Marshall, curator of the Oregon State Arthropod Collection, is helping to lead a large collaborative project, the Oregon Bee Atlas, a rich resource on the over 500 species and tens of thousands of specimens of Oregon bees. Numerous undergraduate curatorial assistants are helping to generate a historical baseline dataset so as to better understand and track changes in our pollinator community and carefully archive new specimens collected by an army of citizen scientists across the state. The project has already improved our understanding of native bee diversity and discovered species not previously known here.

FRONT RUNNERS

INTEGRATIVE BIOLOGY FACULTY TAKE THE LEAD



Jamie Cornelius

Moving on up

Lindsay Biga was promoted to Senior Instructor, and **Jonathan Robinson** was promoted to Senior Faculty Research Assistant. Congratulations!

New faces

Please join us in welcoming several new faculty and an academic advisor who joined the department in the last two years.

Assistant Professor **Jamie Cornelius** brings her exciting ecophysiology research along with a passion for sharing her knowledge with undergraduates in both the classroom and the field. She received her Ph.D. from the University of California, Davis in 2009 and was then a postdoctoral researcher at the Max Planck Institute for Ornithology in Germany before spending four years as an assistant professor at Eastern Michigan University.

A native of Washington state, Cornelius grew up in a family of outdoor enthusiasts. As an undergraduate at the University of Washington, she was on a career path to become a veterinarian when working in a professor's lab made her realize that being a research scientist "combined creativity plus biology, plus the outdoors, plus students to create the best job in the world!"

"Helping a student to discover a love for science and the outdoors is second to none."

JAMIE CORNELIUS

Cornelius studies the ecophysiology of birds, probing the complex mechanisms through which physiology and behavior are

influenced by the environment over ecological and evolutionary timescales. She places high-tech sensors on individual birds and tracks them in real time for days over rugged landscapes to capture the complex data used in her research. Her on-the-ground research will provide many opportunities for our students to combine field observation with laboratory work and computer analysis.

"Helping a student to discover a love for science and the outdoors is second to none," says Cornelius, who is excited to be a part of the department and contribute to its rich history of environmental endocrinology. She is enjoying her work with "such bright students" and local access to red crossbills, one of "the coolest birds ever" and her primary research organism. "I've lived all over the world. The Pacific Northwest holds my heart and the birds that I study. I can't

imagine a better place for my research and my family than Oregon State.”

Instructor **Adam Chouinard** received his B.S. in Marine and Freshwater Biology (2006) and an M.S. in Zoology (2010) from the University of New Hampshire and his Ph.D. from Oregon State in 2016. He teaches upper division undergraduate courses both on campus and online, including Vertebrate Biology and Animal Behavior. He also trains our graduate teaching assistants (GTAs) and loves “helping students to learn and grow and find that elusive ‘Aha!’ moment.”

Chouinard says that he was hardwired to become a biologist ever since discovering salamanders in his childhood backyard. As an undergraduate, he was “lucky to have excellent role models for what it means to be a scientist, but also what it means to be a great teacher. They inspired me to be the best educator I can be, and to focus above all else on what students need in order to be successful.”

Chouinard’s research explores the pheromone communication system of plethodontid salamanders. Using an integrative approach, he explores how biochemical variation in the signal ultimately affects behavioral function, and how these signals have evolved between different lineages.



Adam Chouinard



Carmen Harjoe

“Once I figured out that I could tromp around lakes in waders catching amphibians, I was hooked!”

CARMEN HARJOE

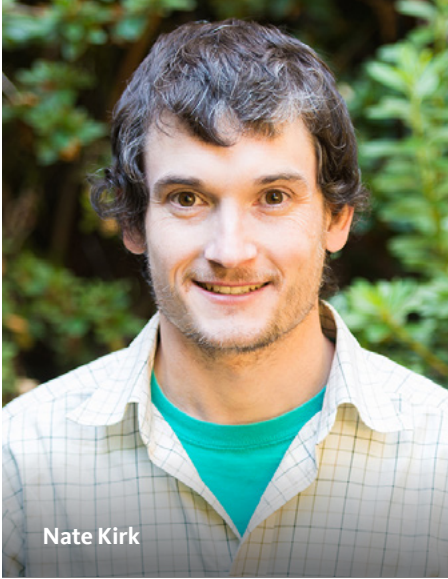
Instructor **Carmen Harjoe** earned her B.S. at the University of Missouri (2013) and her Ph.D. at Oregon State in 2018. As a graduate student, she won the university’s Herbert F. Frolander Graduate Teaching Assistant Award. She currently co-coordinates the Principles of Biology sequence and is a laboratory instructor for the Honors Principles of Biology sequence. Next year she will teach Honors Ecology and develop a new online course on Human Ecology to be offered in winter 2021.

Harjoe originally planned to be an ornithologist, but an undergraduate job as a lab technician in a field-based animal behavior lab sparked her interest

in amphibian acoustics and agonistic behavior. “Once I figured out that I could tromp around lakes in waders catching amphibians, I was hooked!”

Harjoe is grateful to her “amazing” mentor at the University of Missouri, Carl Gerhardt, for deepening her passion and giving her the confidence to pursue what is now a promising career in the study of amphibians, community ecology, and conservation biology. At OSU, Harjoe’s doctoral thesis focused on the cascading effects of the amphibian pathogen *Batrachochytrium dendrobatidis* on the surrounding aquatic community of phytoplankton.

Instructor **Nate Kirk** earned his B.S. and M.S. at the State University of New York at Buffalo (2003, 2006), and his Ph.D. from Auburn University (2012). He teaches the honors section of Principles of Biology as well as our invertebrate zoology courses, including one that takes place at the Hatfield Marine Science center in Newport, Oregon. An important part



Nate Kirk

of undergraduate science education is scientific writing, and Nate teaches two writing intensive courses, Field Methods in Marine Ecology and Critical Thinking and Communication in the Life Sciences. His favorite part about teaching is finding out that one of his students landed a job in the field of biology or was accepted into an internship, graduate or professional school.

A molecular ecologist, Kirk traces the origins of his career to the old Christmas tree farm where he spent his childhood flipping over rocks and poking in streams and ponds. As a college sophomore, he convinced a professor to let him register for an upperclass tropical marine ecology course for which he lacked the prerequisite. After two weeks in the Bahamas, he began volunteering in her lab and she became his master's advisor.

Kirk's current research interests revolve around coral thermal tolerance. He recently partnered with labs in the United Arab Emirates to look at corals in reefs that are experiencing water temperatures that are much higher than elsewhere — with a goal of understanding how corals might respond to impending climate change.

He is also exploring the molecular basis for aggression in the local sea anemone, *Anthopleura elegantissima*.

Instructor **Meta M. Landys** earned her B.S. at the University of Michigan (1996) and her Ph.D. at the University of Washington (2003), where she researched the physiology of migration in birds and conducted fieldwork in the Netherlands and Greenland. She also discovered a love of teaching as a GTA. At Oregon State, she teaches Environmental Physiology and Principles of Biology and assists several online offerings including Genetics; Environmental Physiology; and Critical Thinking and Communication in the Life Sciences.



Meta M. Landys

Landys was an early adopter of OSU's innovative in-the-round arena classroom, where the instructor is surrounded by students. "It can seem 'head-spinning,'" she says, "but it's great; no student in a class of 400 is more than nine rows away from the instructor!"

Like Chouinard, Landys' interest in biology stems from her backyard, where anything alive "eventually wound up in our house." Her parents did put their foot down with respect to two

rattlesnakes, however, who had to live on the back porch in an aquarium "from which they duly escaped."

Landys is grateful for the hands-on undergraduate research experiences that deepened her interest in biology, from collecting data on the social behavior of the American crow to a behavioral study on Bonobo chimps at the San Diego Wild Animal Park. She considers herself an environmental physiologist with a particular interest in how hormones support behavior and physiology in free-living birds, both within the context of their natural life history cycle and life history strategy. In past projects, she has investigated the role of the stress hormone corticosterone in the support of avian migration and the endocrinological underpinnings of territorial aggression, memory formation, and anxiogenic behavior in woodland passerines.

Academic advisor **Joe Meyer** grew up in Tillamook, Oregon, where he taught science at Nestucca High School and was an adjunct instructor of science and agriculture at Tillamook Bay Community College. He is looking forward to helping our students navigate the wide world of possibilities



Joe Meyer

that make up the biological sciences and to find a path that they are passionate about.

University-wide acclaim for faculty

Andrew Blaustein, Distinguished Professor of Integrative Biology, has been awarded the 2019 Richard M. Bressler Senior Faculty Teaching Award, which recognizes full professors who have been at OSU a minimum of 15 years and who consistently provide direct instruction to undergraduate students. His research focuses on amphibian population declines, host-pathogen biology and the social and reproductive behavior (and its evolution) of amphibians, small mammals and invertebrates.

Blaustein has taught and mentored generations of students who achieve much success during their years as undergraduate and graduate students as well as in their careers as scientists.

Lori Kayes and **Devon Quick**, both senior instructors in integrative biology, as well as **Dennis Bennett**, director of OSU's Writing Center, were awarded the 2019 Student Learning and Success Teamwork Award for being the three visionary founders behind OSU's Learning Assistant Program (LA). This award recognizes departments or interdisciplinary groups at OSU that have demonstrated exceptional teamwork in creating and sustaining an exemplary teaching and learning environment to advance the university's strategic goal of student success and excellence.

Through the LA program, Kayes and Quick train high-achieving undergraduates to facilitate peer discussions and class activities. LAs foster in-class learning by providing



individualized feedback as students grapple with complex questions posed by the instructor or by other classmates. This experience builds the confidence of the student LAs and creates strong connections with their learner peers. The LA program has helped transform classrooms into sites of active learning that give students more responsibility for their learning.

Lori Kayes also won a second university award, the 2019 OSU Faculty Teaching Excellence Award, which honors unusually significant and meritorious achievement in teaching and scholarship that enhances effective instruction. She is also co-PI on a five-year, \$1M project, "Inclusive Excellence @ Oregon State," supported by the Howard Hughes Medical Institute to produce sweeping cultural changes in post-secondary institutions through a variety of pedagogical approaches to increase diversity and inclusion of underrepresented minority students in science programs.

Virginia Weis was named a 2019 Distinguished Professor, the highest academic honor the university can bestow on a faculty member. Weis is an internationally recognized leader in coral symbiosis, as well as the head of our department. Her career has traveled the arc from foundational cell biology research to a dogged quest for solutions to prevent the destruction of corals and ensure their preservation in the future. For more than two decades, her research has focused on the symbiotic association between corals and the algae they harbor within their cells, and the role of this mutualistic relationship in the foundation and sustenance of healthy coral reef ecosystems.

Weis has published nearly 100 peer-reviewed papers. The College of Science has awarded her both of its top research accolades, the Milton Harris Award in Basic Research and the Thomas T. Sugihara Young Faculty Researcher Award. She has mentored 16 Ph.D. students and 11 postdoctoral fellows and hosted 70 undergraduate students in her lab.



Elisha Tikasingh

STAYING CONNECTED

ALUMNI AND FRIENDS



Megan Cook

Congratulations!

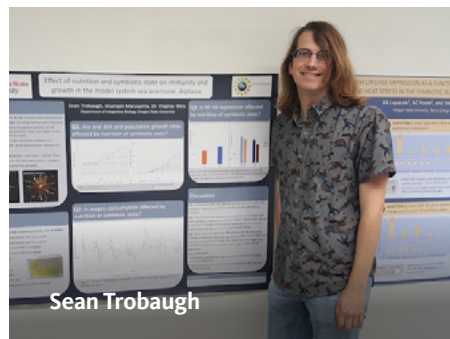
Megan Cook (Biology '09) won the College of Science 2019 Young Alumni Award, a tribute to her storied international career to date spanning research, marine operations, media communication and ocean education. The award publicly recognizes alumni for extraordinary professional accomplishments achieved early in their career that bring credit to the college and the university.

Since graduation, Cook has researched coral reef ecosystems, coastal oceans and the deep sea, promoted ocean literacy, and made films as a diver. She has served as director of education

for the nonprofit I Am Water Ocean Conservation Foundation in South Africa where she taught personal development and marine conservation through freediving and even worked as a submarine copilot.

Lorraine "Mamo" Waianuhea (Biology '18) was an alternate for a 2019-20 Fulbright scholarship, one of the most prestigious national awards a student or alumnus can receive.

Sean Trobaugh (Biology '18) won a SURE Science award to continue his



Sean Trobaugh

marine research in the Weis Lab on the symbiotic relationship between algae and their anemone hosts. A passionate scuba diver, Trobaugh hopes to pursue a master's degree and eventually a Ph.D. while working in the Weis Lab.

Julianne Gurnee Bonnell (Zoology '14), a high school biology teacher at Chimacum High School in Chimacum, Washington, won a Knowles Teaching Fellowship. The five-year program supports math and science teachers in the early phase of their careers.

Alumni updates: fieldnotes

Karen Tonsfeldt (Zoology '08): "I'm currently a postdoc at University of California, San Diego, and I miss Oregon! I am grateful for all of the zoology graduate students who befriended me and acted as mentors (I call them frientorships). They really helped me navigate the next steps in my academic career."

Leanne Klinski (Zoology '04): "After graduation, I got a job at the Oregon Zoo, thanks to my research in the Mason Lab drawing blood samples from garter snakes. Fifteen years later, I am now a zookeeper at the San Diego Zoo! I have such great memories from OSU and urge all students to work in a research lab because it really can enrich your coursework and give you a step up on a career path."

Elisha Tikasingh (Ph.D. Zoology '60): "After graduation, I spent the summer in Alaska on a project tagging King Crabs for the U.S. Fish and Wildlife Service. Then I accepted a Rockefeller Foundation Fellowship to study arthropod-borne viruses (arboviruses) at the Trinidad Regional Virus Laboratory in Port of Spain, Trinidad and Tobago (my home country). This lab subsequently became absorbed into the University of the West Indies Department of Microbiology, Faculty of Medicine, and I was appointed lecturer in microbiology. In the lab, I described the Nariva and other new viruses. I also investigated outbreaks of eastern equine encephalitis in Guyana and in Trinidad. In 1975 the lab changed directions and, as a new entity called the Caribbean Epidemiology Centre, changed its focus to the surveillance of infectious diseases in the Caribbean. The Centre was administered by the Pan American Health Organization/World Health Organization, which gave me a mandate to start a parasitology laboratory and to investigate vector-borne diseases in the Caribbean. Over the span of my career, I wrote over 100 scientific papers, three historical non-fiction books, edited three others, and during retirement, I was the editor of a local scientific journal called *The Living World*. I have been the recipient of several awards including doctor of science (Honoris causa) from the University of the West Indies."



MAJOR RENOVATION TO ENHANCE LEARNING, RESEARCH

We're excited to share the news that Cordley Hall, our department's home — a building that has supported the biological science instruction of tens of thousands of undergraduates since it was built in 1956 — is about to get a long overdue upgrade!

"Cordley is one of the largest buildings on campus and one of the most important for a combination of missions," said College of Science Dean Roy Haggerty. "This includes research, teaching and outreach in multiple departments within the College of Agricultural Sciences and the College of Science."

A complete modernization of Cordley's mid-century infrastructure will begin in 2020 and be completed in 2024. The renovation will take place in two phases in order to temporarily relocate all the classrooms, research and office space in this heavily used building.

What's in store? A new roof and energy-efficient windows will replace

the old, leaky single-paned ones. Seismic retrofitting and reworked electrical, plumbing, computing, air flow and fire suppression systems will provide a more reliable, safe and comfortable environment for students, faculty and staff.

In addition, the entire floorplan will be modified to establish 63% more teaching space with a flexibility suitable for a wide range of learning styles. Research space will be more modular, fostering increased collaboration across labs and easier adoption of modern biology's ever-changing technology and equipment. The public will also gain easier access to two world-class natural history collections, our department's insect and arthropod collection, and the Department of Botany and Plant Pathology's plant, fungal and lichen collection.

The university is currently seeking funds to create student study and public engagement areas throughout the building and to convert Cordley's open courtyard into a partially covered social area that incorporates interpretive displays and artwork that showcases OSU's many, diverse contributions to biological science and education.



Oregon State University
College of Science

Department of
Integrative Biology

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