

Small Talk

WINTER
2016
Microbiology news,
students, faculty,
research and alumni



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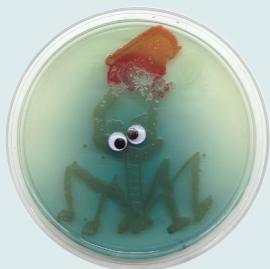
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On the cover

Petri dishes painted with microbes from the department's Art Lab event.



The bacterial palette consisted of cultures used in the MB 303 general microbiology lab: *E. coli* (cream), *Pseudomonas aeruginosa* (blue-green), *P. aureofaciens* (orange), *Serratia marcescens* (red), *Micrococcus luteus* (yellow), *Staphylococcus aureus* (pale yellow), and *B. subtilis* (white).



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The Microbiology Department is growing thanks to the generosity of our alumni and friends.



FROM THE DEPARTMENT HEAD

Welcome to the Department of Microbiology's new newsletter! We have given it a facelift and are revamping the content to give you a broader view of everything that is important, timely and interesting.

My first year as Department Head has been quite a busy one for both me and for the department. We underwent 10-year program reviews of both our undergraduate and graduate programs. I'd like to thank Theo Dreher, my predecessor and Department Chair for the past decade, for making these programs such a phenomenal success. The reviews offered me an opportunity to learn a great deal, very quickly, about the programs, and to think about areas to improve upon or modify as our student population grows and changes.

Last year our undergraduate program expanded to more than 1,100 students when the BioHealth Sciences program joined our department, which has been an exciting addition. To assist with this instant growth, we hired a new instructor, Dr. Jeneva Anderson. Our undergraduate students have been very active this year; in the pages ahead you will read about the Microbiology Student Association's research symposium and the new BioHealth Sciences Club's plans.

In terms of our faculty, Theo took a

well-deserved sabbatical in Australia this year, while Janine Trempey is now spending part of her time as Associate Dean for the Division of Academic Affairs. Our faculty were involved in exciting research that covered topics as diverse as the gut microbiome and blue-green algae and had them traveling to field sites from French Polynesia to the North Atlantic Ocean. You can read about some of these in this newsletter, but visit our website for timely updates, news and our research blogs.

We added a new aspect to our newsletter: alumni news. Please let us know where you are and what you are doing so we can keep in touch and share your success.

Finally, I want to thank our generous alumni and donors who have contributed in so many ways to the department. I am happy to share some of the stories about how your support of scholarships, opportunities for research and travel, equipment upgrades and celebrating our successes have enhanced our students, our faculty and our work.

I look forward to meeting more of you in the upcoming year.

Jerri Bartholomew

Head, Microbiology Department

EVENTS



APRIL 2, 2016

2ND ANNUAL MSA SYMPOSIUM

The undergraduate Microbiology Student Association, with help from graduate students, organize this full day of research presentations from across the state, combined with a student poster session (see page 3).

MAY 9, 2016

SCHOLARSHIP LUNCHEON

An event celebrating the success of our undergraduate students who receive scholarships and the generosity of those who make these possible.

JUNE 9, 2016

GRADUATION CELEBRATION

The department recognizes graduates at our Microbiology and BioHealth Sciences Graduation Celebration.

On the move

Our amazing undergraduates balance academic life with transformative experiences.

PROFESSIONAL CONFERENCES

The Microbiology Department is very excited about all of the opportunities we provide to our undergraduate students, due to generous gifts and strong support. One of the highlights is the opportunity to attend professional conferences. This gives students a glimpse into the professional world, with opportunities for networking and the chance to explore new directions.

Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)

Jose Morales (BHS): This was the first year that I attended the SACNAS National Conference. Beginning with the atmosphere, I felt like I belonged there, seeing so many people of my own color, which I usually don't see at OSU, especially in science. There were many professional and students of color, students that have the same background and goals as mine. It was a great opportunity to network with students and professionals. The workshop "MD-PhD, Is It Right for Me" especially resonated with me because I had never heard of an MD-PhD degree. I want to acquire my degree in optometry, but also want to do research. So it was interesting to know that some people are actually both a doctor and a scientist.

American Society for Microbiology (ASM)

Jeannie Klein (MB, BPT, HBS): In May,

Dr. Linda Bruslind accompanied four microbiology students to the ASM National Conference in New Orleans. We experienced four days with over 8,300 attendees, immersed in a wide variety of microbiological topics, such as microbes ranging from viruses and archaea to bacteria and fungi, and inhabiting just about every place imaginable: permafrost in Antarctica, the space station, oceans, plants, food, animals, insects, and so many more. The best way to describe it would be with numbers: There were 79 sessions and 2,900 posters presenting the latest research findings. As a plant pathologist, my favorite presentation was a study of the microbiome of lettuce and how microbial populations can interact to suppress the growth of certain strains of *E. coli*, which are common pathogenic contaminants of fresh produce.

I am very thankful that I was chosen as a part of the select group of students to attend. Without donors, this experience would not be possible. Thank you for investing in the future of microbiology!

Regional American Society for Microbiology Conference

In November, Jeneva Anderson and Linda Bruslind accompanied 21 students to the Pacific Northwest Branch meeting of ASM, hosted by the University of Washington in Seattle. One of the keynote speakers was Regina Rabinovich from the T.H. Chan School of Public Health at

Harvard University, who spoke about the evolving story of malaria and the global efforts towards eradication. The sessions featured both clinical and applied research, including several interesting case studies by medical doctors, epidemiologists, and microbiologists.

UNDERGRADUATE RESEARCH EXPERIENCES

Approximately 50 percent of our undergraduate microbiology majors participate in research. Over the past 10 years, undergraduates have co-authored 23 publications with—a great start whatever a student's career choice.

Marius Ibuye (BHS, '15) completed his honors thesis in Kim Halsey's lab work studying the effects of dark period on the growth of *Synechococcus* WH8102, a very abundant cyanobacterium in the open ocean. He is now working on becoming a Doctor of Pharmacy at OSU.

Rachel Tullsen (MB, '15) was a URISC student (Undergraduate Research, Innovation, Scholarship and Creativity) in Kim Halsey's lab, where she developed chemostat systems for growing *Synechococcus* WH8102 at steady state growth rates, which is a useful system for mimicking open ocean conditions. Rachel is now working for doing microbiology for a company in Idaho.

Aidan Maxwell (MB) worked in the

Dreher lab, sampling as well as processing and archiving samples taken during cyanobacterial blooms in Dexter Reservoir near Eugene. While these blooms have fortunately been non-toxic, constant monitoring is needed to ensure the safety of Dexter Reservoir as a drinking water source and recreation site. Dexter Reservoir has been sampled extensively in order to study the population dynamics of several distinct cyanobacterial that jostle for dominance during the bloom season.

Jessica Nava (Biology) is participating in the OSU STEM Leaders Program and works in the Bartholomew Lab where she is using PCR to describe the occurrence of malacosporean parasites in Oregon vertebrates and invertebrates. Malacosporeans are fish parasites that are distant relatives to jellyfish

STUDENT CLUBS

Microbiology Student Association

Jessica Tran (MB): Last April the Microbiology Student Association hosted its first research symposium at the Linus Pauling Science Center on campus. Inspired by the annual American Society of Microbiology Northwest conference and other national conferences, the group aimed to bring the same experience to Oregon State University so students and the community could learn about current research and have the opportunity to network with professionals in the field.

Altogether, 13 speakers hailing from Oregon Health and Science University, Portland State University, Reed College, and OSU talked about their research in areas ranging from the microbiome to chlamydia to the secret social lives of bacteria.

The day-long symposium concluded with a presentation from keynote speaker and OSU alumnus Dr. Mike Riscoe, who is currently the director of the experimental chemotherapy laboratory at OHSU. Dr. Riscoe's research on malaria engrossed students, as he and other presenters showed that the opportunities and the possibilities of what students can achieve following graduation are endless. A poster session by undergraduate and graduate students followed, which gave students the opportunity to show off their own research and speak with presenters.

The Research Symposium provided a taste of the amazing research performed in Oregon while illustrating the generosity of the Department of Microbiology. For instance, professors willingly gave up an entire Saturday to support the event, MSA members spent months planning the symposium and students spent a Saturday learning more about science.

The Department of Microbiology already has a strong reputation as a challenging discipline with supportive faculty. But this symposium showed that the department isn't amazing

IN THEIR OWN WORDS...

"I did not have any interests in research until I switched majors from Biology to Microbiology during this term. In my General Microbiology 302 class, I became interested from Dr. Halsey's passion. From all the classes I have taken so far in OSU, I have never been so interested in a subject that is entirely new to me. I wanted to look for a research position as soon as possible." — **Natalie L.** (MB)

"I am a Microbiology major and an Ambassador for the College of Science with a passion for science and discovery. I am currently in the process of applying to medical school, with plans of earning my MD after I graduate from Oregon State University. Thanks to you, my goal of continuing my education beyond an Honor Baccalaureate is that much closer to being achieved." — **Navid Z.** (MB, '15)

"It is an honor to be considered an outstanding microbiology major performing in undergraduate research... I will continue to work hard in my research and in my studies so that I can uphold the honor of this achievement and reassure you that I will not take this scholarship for granted." — **Brandon W.** (MB)

SMALL TALK: STUDENTS

merely because of how intricate bacteria and viruses are – it is phenomenal because of everybody's contribution and dedication. Much like a biofilm, we are strong as individuals, but invincible as a team.

BioHealth Sciences Club

This newly formed, student-led association provides students with academic and co-curricular experiences tailored to their interests in pursuing careers in the health care field. The club provides opportunities for students to engage with medical practitioners, contribute to local and global communities through service and support each other academically and professionally. Students gain valuable exposure by meeting graduate program representatives, learning about alternative careers through academic and experiential training as well as accessing professional development opportunities.

AWARDS

Science communication

Students conducting undergraduate research now have the opportunity to present their findings once a term at our department colloquia.

Spring term awards are given to the best presentations as ranked by faculty. In 2014-2015, the following students received the Departmental Undergraduate Awards for Best Research Presentations:

1st Place Senior Presenter

Dillion Odle, Schuster Lab

"A molecular construct for inducible production of a public good in *Pseudomonas aeruginosa*."

2nd Place Senior Presenter

Jeannie Klein, Stockwell Lab

"Contribution of native plasmids to the fitness of *Pantoea vagans* C9-1 on flowers."

3rd Place Senior Presenter

Deirdre McAteer, Vega-Thurber Lab

"Characterizing the microbial eukaryotic communities of corals affected with dark spot syndrome using next-generation sequencing and metagenomic analysis."

Junior Presenter

Jonathan Diaz-Hui, Waite-Cusic Lab

"The risk of *Salmonella* spp. from small poultry operations in Oregon."

Sophomore Presenter

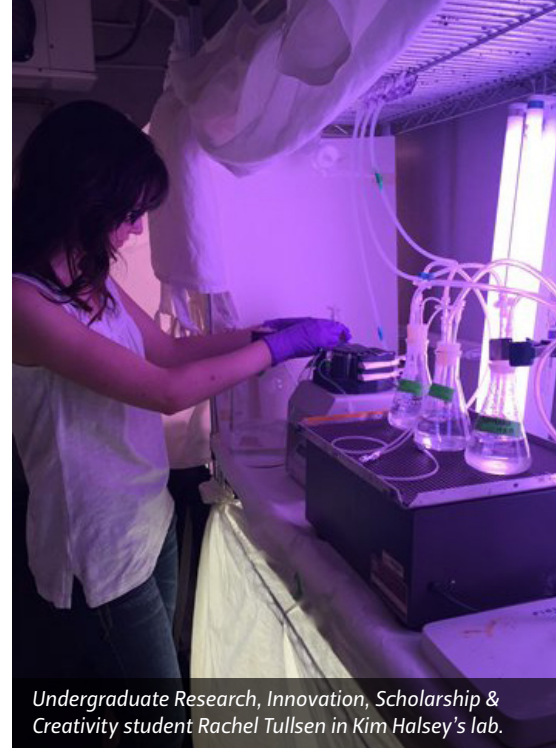
Matthew Borchers, Colwell Lab

"The impact of sediment interfaces on microbial communities beneath the South China seafloor."

Freshman Presenter

Michelle Michelsen, Giovannoni Lab

"Verifying growth and inhibitory proteins with SAR-11." ■



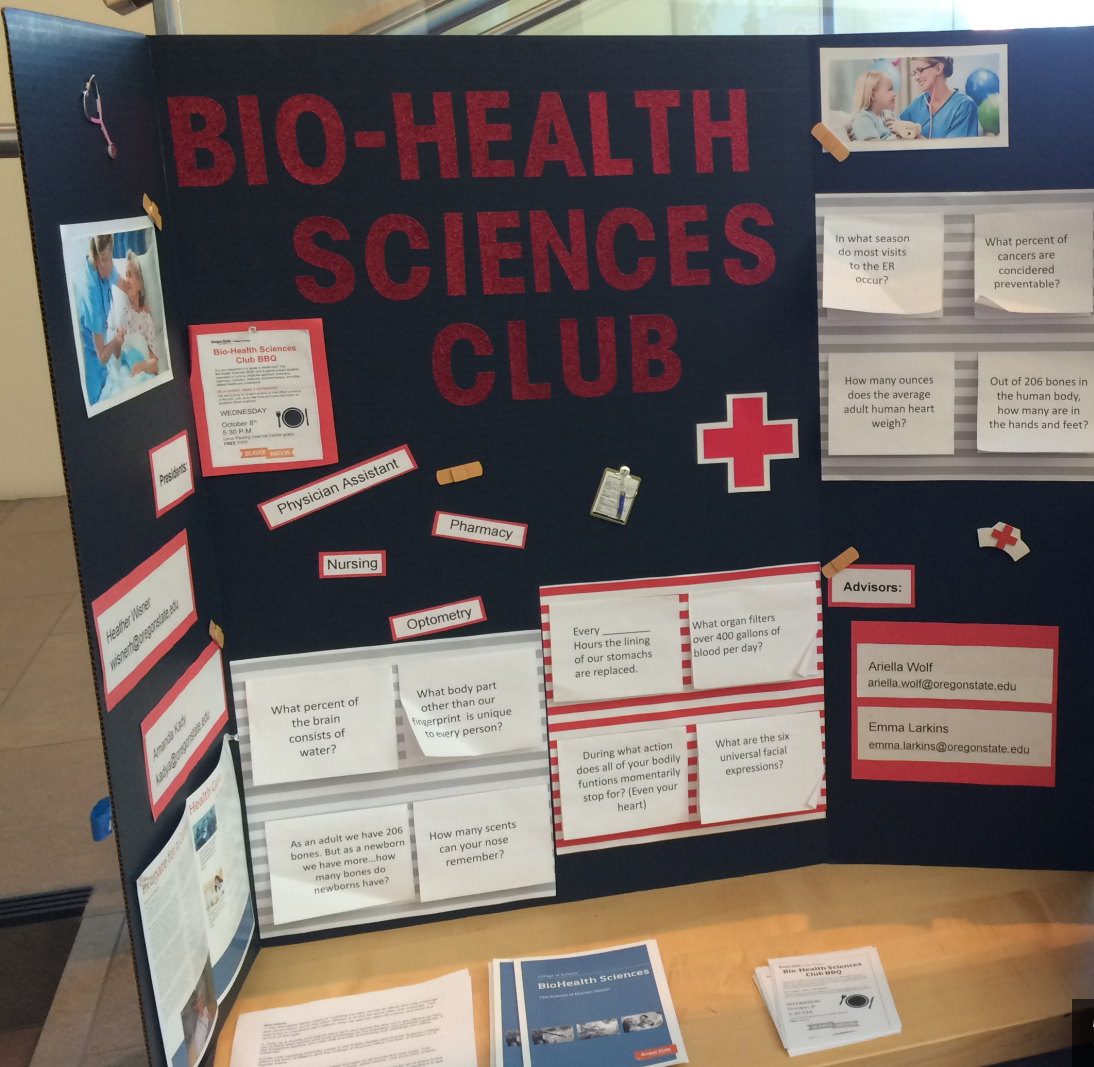
Undergraduate Research, Innovation, Scholarship & Creativity student Rachel Tullsen in Kim Halsey's lab.



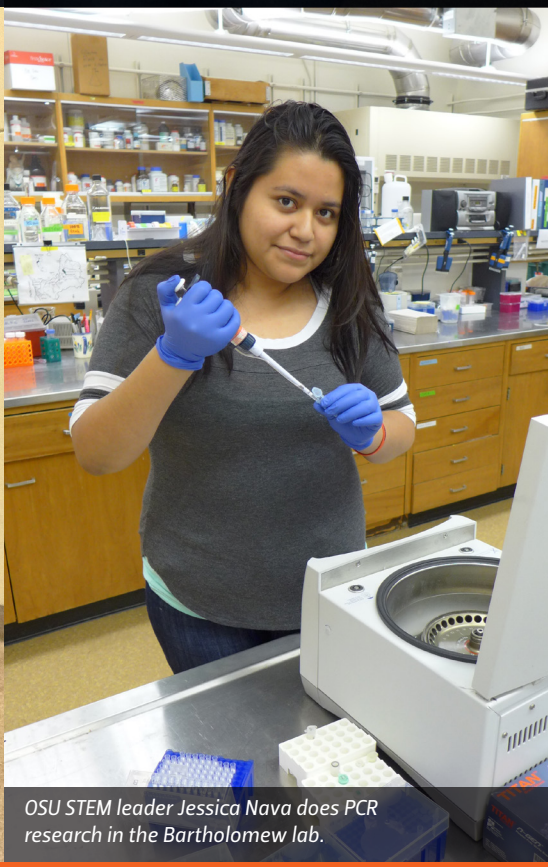
Marius Ibuye (BHS, '15) completed his honors thesis in Kim Halsey's lab.



Peter Wong, Jeannie Klein, Linda Bruslind, Rhett Bennett, Allan Yoshinaga at ASM 2015.



BHS student Amanda Kady at a Connect week welcoming event for incoming students.



Bright minds

Updates from our graduate students and postdoctoral researchers

NEW GRADUATE STUDENTS:

In their own words

Claire Howell: I am developing a monitoring protocol for the freshwater fish parasite *Ichthyophthirius multifiliis* (Ich). My research in the Bartholomew Lab examines the relationship between parasite density, water temperature and salmonid disease rates in the Klamath River system.

Lauren Norris: More and more zebrafish (*Danio rerio*) are being used as models in biomedical research. My research in the Kent Lab focuses on molecular diagnostic testing for zebrafish pathogens, particularly the sensitivity and specificity of these tests.

Laura Taggart-Murphy: I am beginning a PhD program by doing rotations, starting with a collaborative project in the Bartholomew and Dolan Labs investigating mucosal immunity and resistance mechanisms to the myxozoan parasite, *Ceratomyxa shasta*, in rainbow trout.

Winnie Wang: I am interested in microbial ecology, especially looking at how microbes interact with each other and the world around them. In the Bottomley Lab, I am studying ammonia-oxidizing bacteria and archaea and their roles and contributions to nitrification in soil under varying levels and rates of nitrogen availability.

Sarah Vojnovich: My research in the Bartholomew Lab examines disease

risks for different salmon and trout species by determining the temporal and spatial distribution of important myxozoan parasites in the rivers.

Juliette Ohan: As populations grow and buildings grow older, the need to stabilize soil for supporting existing and impending structures emerges. In Rick Colwell's Lab, I am investigating microbial enrichment strategies to induce CaCO₃ precipitation, thereby strengthening the soil mass and providing capacity for long-term soil stabilization.

TRAVELS AND ADVENTURES

Scott Klasek, a graduate student in Rick Colwell's Lab, traveled to Shanghai on a China EASPSI fellowship to work with Dr. Fenping Wang at Shanghai Jiao Tong University, renowned as one of the oldest and most prestigious universities in China. Scott studies microbes in marine sediments and this collaboration allowed him to use high-pressure incubators to study hard-to-grow microbes. He will be looking at DNA and RNA from these samples to see what microbes are present and what types of methane-eating genes they produce. His hopes are that this will lead to better carbon cycling models in the marine subsurface.

In the summer of 2014, Microbiology Ph.D. student **Ryan McMinds** traveled to the Great Barrier Reef in Australia. From the lab of Dr. Rebecca Vega Thurber, Ryan's research interests focused on

the interactions among coral animals and the microbial organisms associated with them. Specifically, he wanted to know how the vital functions that microbes provide for corals, such as nutrient provisioning and the prevention of disease, have influenced the evolution of the community. Modern corals have been evolving for about the same amount of time as all flowering plants. Therefore, there is a stunning amount of potential for diversity in their strategies for living with microbes. Have certain corals developed mechanisms to tightly control which microbes live with them, like plants like legumes have? Have particular microbes become dependent on the environment provided by corals? To find out, the Vega Thurber lab needed to know more about the structure of microbial communities in a taxonomically diverse set of corals.

The trip to Australia was conceived as a pilot: he was to meet fellow experts in coral reef microbiology, become well-versed in the taxonomy of corals, practice sampling and laboratory processing methods, and collect samples from a number of very different species of corals. At the time, he wasn't certain whether the fieldwork for the project would end after the one trip, or if it would be continued after he returned.

As it turned out, the lab was awarded a large NSF grant to continue the study, written by Dr. Vega Thurber, postdoc Jesse Zaneveld, and collaborator Dr.



Ph.D. student Ryan McMinds has seen the value of fieldwork up close.

Monica Medina at Penn State University. Thus, Ryan's fieldwork had only just begun. This year, he continued his collections, traveling to the Red Sea in Saudi Arabia; Curacao in the southern Caribbean; Tahiti in the South Pacific; and the French island of Reunion, off of Madagascar in the Indian Ocean. At each location, he worked with local collaborators to collect corals while on SCUBA or snorkeling. With these coral samples, he is now working with collaborators to sequence marker genes to build a host phylogenetic tree and identify the fungal, bacterial, and algal members of the communities, as well as perform targeted metagenomics and metabolomics. Various bacteria will also be cultured for further experimentation and genomic sequencing, and the lab is developing new bioinformatic tools to detect coevolution within these complex communities.

Ryan's project has led him to a number of unique and beautiful places, and he has tried to share some of their beauty by maintaining a blog throughout his travels. *The Cnidae Gritty* is available in both English and Spanish. Beautiful footage from Ryan's travels has also been used in OSU's Beaver Nation campaign and in the trailer for a planned feature film about the loss

of coral reefs. The Vega Thurber lab considers these outreach components a very important part of the project because this valuable and irreplaceable ecosystem is currently undergoing unprecedented decline as a result of human activities. They hope to inspire action while contributing to solutions.

This winter another student in the Vega-Thurber lab, **Stephanie Rosales**, will be packing her bags. Through the NSF Graduate Research Internship Program (GRIP), Stephanie has an opportunity to do research with a government agency. Her first stop is our nation's capital where she will meet her internship supervisor in Washington, D.C., at the Smithsonian National Zoo, one of the oldest zoos in the United States.

At the National Zoo, she will train on diagnostic procedures for Elephant endotheliotropic herpesvirus (EEHV). EEHV is a herpes virus that can be fatal to Asian elephants, especially juveniles. After training, she will head to her next stop, Nepal! Asian elephants in Nepal, were recently found to be infected with EEHV. With the training at National Zoo and the assistance and facilities from the Center of Molecular Disease-Nepal (CMDN), Stephanie will work to determine the prevalence rates of EEHV

in a female mating population of Asian elephants in Chitwan National Park, Nepal's first national park.

POSTDOCTORAL RESEARCHERS

Dr. Christopher Gaulke, a scholar in Tom Sharpton's Lab, was awarded a \$1,000 professional development grant from the OSU Postdoctoral Association. He will use the funds to establish an undergraduate bioinformatic research training program that he will lead in the 2015-2016 academic year.

Dr. Gema Alama Bermejo, a visiting postdoctoral scholar from Valencia, Spain, is working between the Bartholomew Lab and a laboratory in the Czech Republic. This collaboration allows her to use transcriptome mining to study the role of proteases as virulence factors in myxozoan parasites of fish.

Dr. Justin Sanders, a scholar in Mike Kent's Lab, published a zebrafish model for *Toxoplasma gondii* infection in the *Journal of Fish Diseases* and received a postdoctoral poster award for his presentation of this work at the 13th International Congress on Toxoplasmosis and *Toxoplasma gondii* research in Gettysburg, Penn., this past summer. ■

From our Labs





Graduate student Omran Muslin (L) and Stephen Giovannoni (R) aboard the Atlantic Explorer off the island of Bermuda

Stephen Giovannoni (LEFT) ended 2015 on a NASA research cruise studying North Atlantic phytoplankton with collaborators Kim Halsey and Mike Behrenfeld. His lab is measuring microbial plankton diversity on this large, multi-investigator project. Another new project that is supported by an anonymous foundation will send the team to back to their long-term study site in the Sargasso Sea to investigate the ocean carbon cycle with long-time collaborator Craig Carlson. Thanks to these projects, Steve and his team will be spending a lot of time at sea in the years ahead. Their research continues to blend microbial cell biology with oceanography to gain a better understanding of global transformations of carbon compounds by ocean plankton.

Steve no longer teaches in Bermuda, and this year has shifted his outreach activities to a new professional development teacher activity: Carbon Cycling by Marine Microorganisms, in association with OSU's Science & Math Investigative Learning Experiences (SMILE) program. The mission of SMILE is to inspire and prepare minority, low-income, historically underrepresented and other educationally underserved students from rural areas to graduate from high school, enroll and succeed in higher education and pursue STEM careers. Steve, postdoc Jing Sun and graduate student Omran Muslin offered the first workshop of the new program to visiting teachers in August.

Sharpton Lab: This was a productive year for the Sharpton Lab. Since almost everyone in the lab joined within the past 15 months, we focused on establishing research projects. This included training these new researchers in bioinformatics, a new area for most of them. We conducted several pilot experiments,

which promise fruitful future research directions. Along the way, we published three manuscripts on human microbiome research and will submit three more for peer review before the end of the calendar year. This includes our landmark discovery that the healthy human microbiome is compositionally structured by natural selection, which carries important implications for the development of microbiome therapeutics. We also developed a computational method that infers how the human microbiome operates and used it to discover potential diagnostics of Crohn's disease, as well as how the gut microbiome may induce or modulate disease. We look forward to seeing how our newly established projects mature in the coming years to complement our recent discoveries.

Dreher Lab: During 2015, we continued to develop what we think will be a new way of analyzing and monitoring cyanobacterial blooms. We anticipate that the current emphasis on microscopic analysis in monitoring will ultimately be replaced with DNA-based genetic analyses. After analyzing bloom samples from lakes using shotgun metagenomics, we uncovered genomes of the abundant cyanobacteria and identified genes for toxin and taste-and-odor compounds that may be present. We are also using this approach to identify factors that drive bloom population dynamics; our goal is to understand the triggers that determine which cyanobacterium will bloom at a certain time, and that cause changes in the size and species composition of a bloom over time.

To complement the metagenomic analysis designed to catalog all of the more abundant genes in a sample, we determined the genome sequences of significant cultured cyanobacteria,

such as an anatoxin-a producing *Anabaena* responsible for highly toxic blooms in Anderson Lake in Washington (**RIGHT**).

Mueller Lab: We will begin the new academic year by working on two newly funded projects in the lab. The first is a 3-year, NSF-sponsored research project that will examine abiotic controls on microbial degradation of proteinaceous material in soils collected across Oregon. We will work with David Myrold and Markus Kleber in the Department of Crop and Soil Science at OSU and with Robert Hettich at Oak Ridge National Lab to develop innovative proteomics approaches to better understand organic nitrogen turnover and availability in soil ecosystems.

The second project is a multi-year, USDA- National Institute of Food and Agriculture (NIFA) funded grant that will support research on microbial community dynamics within aquaculture facilities in the Pacific Northwest. With help from collaborator Claudia Häse in OSU's College of Veterinary Medicine, we will define community signatures within microbial communities that are indicative of Vibriosis-related disease events in aquaculture facilities.

Schuster Lab. We investigate how and why bacteria cooperate and communicate – how and why they do certain things (like causing disease!) in groups rather than by themselves. This year we finally published a study six years in the making that involved graduate students Jessica Huie and Kyle Asfahl. The study reveals a trick that allows cooperators to resist non-contributing cheaters. We also published a concept article with an international collaborator that

attempts to derive general principles common to all bacterial species that cooperate and communicate.

A mechanism of cheater control (**RIGHT**). Schuster lab students Joe Sexton, Rochelle Glover and Kyle Asfahl illustrate the concept during an exam.

Vega-Thurber Lab: This has been a busy year for the Vega Thurber lab. Several students won awards and scholarships and a few had their first papers published. Rory Welsh successfully defended his dissertation on the role of predatory bacteria in host microbiomes and had three chapters published, including one that highlights his work in the American Society for Microbiology's (ASM) magazine, *Microbe*.

Stephanie Rosales (**RIGHT**) published her paper on using viral and bacterial transcriptomics to evaluate the causative agents of harbor sea die offs in the journal *PLoS One*. Stephanie recently received a prestigious NSF GRIP award to travel to Nepal with the Smithsonian Institute where she will study viral diseases of elephants. Our team is in the second year of the Global Coral Microbiome Project, a NSF funded effort that aims to evaluate the co-evolution of bacteria with threaten corals.

Graduate student Ryan McMinds, postdocs Jesse Zaneveld and Jerome Payet, and Rebecca Vega Thurber traveled around the globe—from Saudi Arabia, Indonesia, Curacao in the southern Caribbean and Reunion Island in the Indian Ocean to Moorea in French Polynesia—to isolate samples for the study. So it's been a busy and productive year. We hope 2016 is as exciting and fruitful!

Bartholomew Lab: This year was marked by the publication of the

textbook *Myxozoan Evolution, Ecology and Development*, to which our lab contributed more than half of the 21 chapters. We also hosted many visitors: Jesse Marley, a high school student intern in the summer Saturday Academy's Apprenticeships; Deidra Spencer, a Murdoch Charitable Trust Partners in Science high school science teacher from Sweet Home, OR; and two graduate students from Brazil: Diego Viero and Suellen Zatti.

A research collaboration sent Stephen Atkinson across the country to South Carolina to work with Dr. Isaure de Buron (**RIGHT**) of the College of Charleston where they searched for the fish-infectious stage of *Kudoa inornata*, a common muscle parasite of seatrout. No *Kudoa* lifecycle is known, despite this group being widespread fish parasites that can cause gastroenteritis in humans. A new collaboration with Tamar Lotan from the University of Haifa in Israel involves investigating structure and function of myxozoan stinging cells in order to develop treatments that block infection.

Halsey Lab: I write this from a lab inside the R/V Atlantis (**RIGHT**). It is November, and we've been transiting through the North Atlantic for three weeks, with one more week to go. Cleo-Davie Martin, a post-doc who joined the lab in April, is with me along with a proton transfer reaction mass spectrometer that she calls "James" (because it is number 007 of its kind), which is capable of measuring very low concentrations of volatile organic compounds.

Cleo (**RIGHT**) has done an amazing job setting the instrument up so that she can measure these relatively unstudied compounds in the ocean. This project is part of a large interdisciplinary project funded by NASA to understand

the factors driving the large annual North Atlantic phytoplankton bloom and quantify how the bloom influences the climate. This cruise is the first of four and has been very exciting with huge waves, wind, and sleepless nights. If you are interested in learning more about this NASA mission, visit naames.larc.nasa.gov.

The lab is involved in other projects, including a study on phytoplankton-bacteria interactions by graduate student Eric Moore and an investigation of the effects of phytoplankton physiology on microzooplankton fitness by Kelsey McBeain. Stay tuned for new adventures on the high seas and in the lab in 2016!

Kent Lab: The team is investigating the impacts of parasites on endangered Lost River and shortnose suckers in the Klamath Lake. These species are confined to this region and there is very poor survival in their second year of life. This research is a collaborative project funded by the U.S. Bureau of Reclamation and supports one graduate student, Andrew Janik, in Comparative Health Sciences. The most common and severe infection that we have observed is a by a heart nematode, *Contracaecum multipapillatum*. The larval stages of the worm in fish are large and a single worm completely destroys the heart (**RIGHT**). The worm completes its development in pelicans, which are abundant in Klamath Lake, a designated bird refuge. The worms are also common in the hearts of fathead minnows, which were accidentally introduced to Klamath Lake decades ago, and are now the most common fish species in the lake. ■



A toxic bloom in Anderson Lake on Washington's Olympic Peninsula.



Left: A sucker with a heart destroyed by nematode. Right: A sucker with a normal heart.



Joe Sexton, Rochelle Glover and Kyle Asfahl illustrate the concept of cheater control.



Stephen Atkinson traveled to work with Dr. Isaure de Buron of the College of Charleston.



Graduate student and National Science Foundation Fellow Stephanie Rosales.



Postdoc Cleo-Davie Martin joined the Halsey lab in April 2015.



The November Deployment Ship Science Team with the R/V Atlantis (via @NASA_NAAMES).

Alumni

Congratulations to our recent and past graduates!

Let us know where you are—we'd love to include you in the next newsletter.

RECENT GRADUATES

Lmar Babrak (M.S.) – Postdoctoral fellow at the U.S. Department of Agriculture in Berkeley, California, working on the identification, diagnostic testing and function of antigens.

Jessica Chinison (M.S.) – Technician for the College of Veterinary Medicine at Western University of Health Sciences.

Jamie Everman (Ph.D.) – Postdoctoral fellow, National Jewish Hospital in Denver, Colorado, conducting asthma research.

Nerissa Fisher (M.S.) – Faculty Research Assistant in Michael Behrenfeld's Lab, where she works on the North Atlantic Aerosols and Marine Ecosystems Study with Steve Giovannoni, Kim Halsey, Cleo Davies-Martin and Bethan Jones.

Michelle Jakaitis (M.S.) – Spent the year traveling throughout South America and getting married to former lab member Luciano Chiamonte!

Meagan Prescott (Ph.D.) – Working with Manoj Pasty in the OSU College of Veterinary Medicine and applying for a postdoctoral position in the Northwest.

Aimee Reed (Ph.D.) – Postdoctoral researcher with Dr. Claudia Hase in the OSU College of Veterinary Medicine and investigating disease susceptibility of Pacific oysters in light of climate change events.

Sean Roan (M.S.) – Microbiologist with U.S. Fish & Wildlife Service.

Kevin Vergin (M.S.) – Lab Manager for the Australian Center for Ancient DNA, University of Adelaide.

ALUMNI UPDATES

Where are you now?

Many of our undergraduates apply to professional degree programs ranging from medical, pharmacy, veterinary, dental schools, and more, or to graduate school within a few years of graduation.

Erika Mittge ('02) is a medical laboratory technologist at Peace Health Laboratories in Springfield, Oregon. She recently presented a lecture about working in clinical microbiology to first year/transfer microbiology majors and plans to host an event this year so students can visit the clinical labs at Peace Health.

Gabby Morin ('07) was awarded a PhD from the Molecular and Cellular Biosciences program at OHSU in 2015. Her thesis was "A rhesus rhadinovirus viral interferon regulatory factor is virion-associated and inhibits the early interferon antiviral response."

Sue-Jie Koo ('10) is a 4th-year PhD student in the Experimental Pathology program at the University of Texas Medical Branch, in Galveston, Texas. She researches the innate immune response to the parasite that causes Chagas heart disease.

Tamsen Polly ('12) completed her MS in Avian Sciences in 2015 from UC-Davis, with a focus in captive parrot behavior and welfare. Tamsen is currently a Junior Research Specialist in the Matthias Hess Laboratory at UC-Davis.

Dan Horner ('11) graduated from the OHSU Medical School in June. He's specializing in anesthesiology at the University of Michigan, with plans to do a fellowship in cardiothoracic anesthesia.

"This should hopefully allow me to return to Oregon after my training to start my career back in my favorite state." —Dan Horner

Adam Brady ('07) is finishing his fellowship in clinical infectious diseases at OHSU, where he is studying people who have had prior dengue virus infections and characterizing their long-term neutralizing antibody responses to advance the vaccine field.

"I really enjoyed my experience in the microbiology department at OSU. The laboratory techniques and concepts in molecular biology that I learned while an undergraduate I still use today in my medical training." —Adam Brady

"Working as an infectious diseases physician gives me the opportunity to use my microbiology training to diagnose and treat infectious disease as well as perform research to advance the field." ■

News

Innovation, rejuvenation, hires, promotions and awards

QR CODES IN THE CLASSROOM

These ubiquitous codes provide a novel teaching approach that allows students to use their smartphones to go directly to the source of information. Microbiology is in the news daily, but connecting students to current events during class time can be challenging. By using QR codes, which direct students to original microbiology reports, a very simple mechanism is created to connect students with current events without using up class time or inundating students with emails with links to the stories. Try it out!



LIVING AND LEARNING COMMUNITIES

This fall room 330 in Nash Hall was converted to a shared space: a computer lab and a clubroom for the Microbiology Student Association that provides a wonderful opportunity for microbiology students to get together to discuss courses, career plans and other topics. The space is named after long-time professor, chief advisor and alumnus Donald Overholser.

In Spring 2014, OSU established the Health + Well-being Living-learning Community (LLC) in McNary Hall for freshmen with career interests in the health professions. Since about 80 percent of microbiology majors have such interests, this LLC will greatly benefit our students.

REJUVENATION OF NASH COURTYARD

In 2014, **Trevor Gazeley**, was looking for a place to do his Eagle Scout Service project and also to honor his mother Chris, who died of cancer when Trevor was five years old. The Nash courtyard, where Katie Tinneland's memorial tree is located, seemed to be an ideal place. Chris, like Katie, was an OSU graduate and a woman that loved the outdoors. Under Trevor's leadership, Boy Scouts from his troop and other volunteers raised money for rock hardscaping, removed the old plants, added soil, planted shrubs and spread bark mulch over the bedding plants. In addition to Katie's tree, the garden now has a Korean shrub planted as a memorial for John Fryer and special rocks as a memorial to Don Overholser.

Enthusiasm about the new landscape has led to plans for a second phase of the courtyard renovation. This will feature a metal sculpture of the Willamette River that will be mounted on the concrete retaining wall opposite the planting bed and will be highlighted with cast glass pieces where the tributaries join the river. Permanent tables with seating will complete this phase.

JOHN FRYER LAB 25TH ANNIVERSARY

The John L. Fryer Salmon Disease Lab celebrated its 25th anniversary on October 2. The lab is named for John Fryer, who started the fish disease research program at Oregon State and was department chair for 20 years.

A relaxing fall evening and a crowd of more than 150 gathered for the festivities and announcement of the lab's new name: the **John L. Fryer Aquatic Animal Health Facility**. The crowd celebrated and reminisced about Dr. Fryer and his work as well as new developments while enjoying grilled salmon, BBQ, libations and live music.

People toured the new facility upgrade, which is now three times more energy efficient and sustainable. The lab now has the capacity to supply chilled and heated water—between 3.0 and 30°C. These changes expand the research capacity to allow studies on warmwater aquatic species as well as on ecological and climate change questions.

NEW FACULTY

Jeneva Anderson joined the Microbiology department this fall as an instructor after graduating last winter from the University of Oregon. Her research in Karen Guillemain's laboratory was focused on the mechanism and function of chemotactic responses to quorum sensing molecules in the human pathogen *Helicobacter pylori*. Jeneva was also a Science Literacy Program Graduate Teaching Fellow.

Her research background and enthusiasm for teaching are a great match for our department, where she will teach General Microbiology and writing intensive courses for the BioHealth Sciences program.

PROMOTIONS

Kate Field was promoted to professor in 2015. Her research addresses fundamental questions in environmental microbiology and microbial evolution, particularly projects related to examining the effects of microbial contamination in water. These range from marker and technology development and validation to studying antibiotic resistant genes and host-fecal bacteria coevolution. Her techniques have transformed the field and have been successfully applied for rapid assessment of microbial water quality and for microbial source tracking in the United States and internationally.

Among her other contributions, Kate directs two education projects: the BioResource Research program, which is an interdisciplinary undergraduate biosciences major that allows students to earn credit for their research and gain additional experience and professional contacts; and the Bioenergy Education Initiative that provides students with bioenergy core concepts, research experience, professional development and scholarships.

Linda Bruslind was promoted to Instructor II after teaching in the department for the past 18 years. She is notable for the broad range of classes she has taught, ranging from Microbiology for non-majors to 400-500 level graduate courses. As one of her reviewers remarked, "This is a remarkable achievement. I know many faculty who communicate well with advanced students in their disciplines and others who can truly inspire non-scientists, but few who can do both."

Linda serves as the department's chief advisor as well as advisor

and mentor to the Microbiology Student Association, ensuring that students have opportunities to attend professional meetings and to perform outreach. She has received numerous awards for her excellence in teaching and advising. Congratulations on this much-deserved honor, Linda!

AWARDS

Peter Bottomley was awarded the 2015 Agricultural Research Foundation Distinguished Faculty Award. The award is given to Professors within the College of Agricultural Sciences to honor the careers of truly distinguished faculty. The Department of Microbiology salutes Dr. Bottomley and his many contributions to our department!

Jeri Bartholomew was appointed as the Pernot Distinguished Professor in Microbiology. The Pernot Professorship is awarded to a Professor in Microbiology who is recognized as a distinguished contributor to microbiology science and who has a record of contributions to OSU's education and research missions.

She joins a line of distinguished members of the Microbiology faculty, including John Fryer, Jo-Ann Leong, Steve Giovannoni, and Theo Dreher.

BRINGING THE WORLD TO OSU *Visiting scientists*

This year researchers in the department hosted visiting professors from Brazil and Canada; postdoctoral scholars from China, New Zealand and Spain; graduate students on exchange from China, Brazil and Canada; and an undergraduate from China. These exchanges enrich the department in so many ways and foster collaborations that have profound impacts on our research. ■



New instructor Jeneva Anderson will teach General Microbiology and BHS writing courses.



The Nash courtyard houses memorials for Katie Tennesand, John Fryer and Don Overholser.



Trevor Gazeley renovated the Nash Courtyard in honor of his mother and OSU alumna Chris.



(This page) Assorted images from the 25th Anniversary of the newly renamed John L. Fryer Salmon Disease Lab—now the John L. Fryer Aquatic Animal Health Facility.

Help from our friends

We are growing thanks to the generosity of our alumni and friends!

MICROSCOPE GIFTS

Alumnus **Bob Foote** (Geology, '83; Geophysics, '85) took advantage of a \$3,000 match that his former employer Chevron provides to retirees for philanthropic opportunities to help us purchase six new microscopes for our teaching labs. We then matched the funds to purchase six more microscopes! Bob is a Corvallis native whose father was an OSU Professor Emeritus in Agriculture and his mother an OSU alumna.

Bob worked at Texaco after completing his master's degree. When Chevron acquired Texaco, Bob took the "parachute" and left Corporate America. His OSU training served him well: his technical skills got him another job and the problem-solving skills from graduate school carried him through his career. He was fortunate to have a fantastic major professor who prepared him to solve the problems of finding oil, cleaning up contaminated oilfields and reducing greenhouse gas emissions.

"OSU really made me, and OSU had a great reputation for producing great hires."—Bob Foote.

Despite never taking a microbiology course or looking through a microscope, Bob didn't hesitate to make a gift when heard that we needed new microscopes for our teaching labs. We are so grateful for your generosity, which resulted in 12 new microscopes!

UNDERGRADUATE SCHOLARSHIPS

Last year, the department awarded received 26 scholarships that totaled nearly \$30,000 to 24 undergraduate students. These scholarships may be targeted to achievement, need, or discipline, but together they are critical to our students' success, and students are extremely appreciative. Our donors have the opportunity to celebrate with the scholarship recipients at a spring luncheon.

"I am very appreciative of your support of my education and of the education of my fellow microbiology students who have also received this award. As I pursue my dream of one day becoming a family practice physician, it is very helpful and heartening to be given a scholarship like the Middlekauf Scholarship."
—**Allison S.** (MB, '14)

"By giving me the scholarship in your name, you have helped me to shift my focus from the financial burden of higher education to its true purpose: learning and bettering myself. Thank you so much for this award; I promise to use this privilege to the fullest extent of my ability."
—**Jonathan D.** (MB)

"Thank you very much for selecting me as a recipient of the Joseph E. Simmons scholarship! This award has such a rich history and I am honored to become a part of it. I think this award strongly reflects the spirit of

the Microbiology Department—even after leaving the department, Dr. Simmons continues helping students just as the department provides endless support to its students."
—**Jessica T.** (MB)

"Each year, my mother, Martha Aspitarte Wither, and I look forward to meeting the Department of Microbiology scholarship recipients. It is a pleasure and honor to visit with these talented and enthusiastic students who will continue to graduate and medical schools, research, education and many other fields.

"Thomas R. Aspitarte had a lifelong love of science and education, which, with Martha Aspitarte, they passed through the generations. My two brothers, our sister and all of our spouses have long supported our 'family' scholarship at OSU.

Our parents were an inspiration to us and three in our generation became microbiologists/engineers/educators. The next generation has nine scientists/engineers/educators and now they are raising their children, the Aspitarte great-grandchildren, into these careers.

"The Thomas R. and Martha S. Aspitarte Scholarship is our encouragement for the next generation of OSU scientists and engineers." —Ann Kimerling

FRYER FELLOWSHIP

The John L. Fryer Fellowship was established to support students working in fish health. This year, coincident with the 25th anniversary of the John L. Fryer Aquatic Animal Health Laboratory, we made a special request to previous donors, graduates from the fish health program and friends of John Fryer to add to the endowment that supports the fellowship.

This effort was led by Jim Winton, Jo Ann Leong, Ron Hedrick and Jerri Bartholomew: all students or colleagues of John Fryer. Those of us who were fortunate enough to have studied under his leadership, or to have worked with him as a colleague, experienced firsthand the excitement of doing research in a setting of scientific excellence and international reputation.

During the past 20 years, the John Fryer Fellowship has supported 13 students, many of who now work for fish health laboratories throughout the Pacific Northwest, for federal resource agencies, or in academia. This year **Sean Spagnoli** in Michael Kent's lab received the fellowship.

IN MEMORIAM

Harriet M. Winton: A generous donor to the program, she established a fellowship that provides support for a graduate student in fish health, the field in which her son Jim Winton earned his Ph.D. ■



HONOR ROLL

Annual Support for the Microbiology Department

Each year we publish an honor roll of donors recognizing our generous and supportive donors who have made a gift or pledge payment totaling \$1,000 or more between July 1, 2014, and June 30, 2015.

To see your name on the honor roll for this fiscal year (July 1–June 30), make your gift today!

Matthew A. Bacho '92

Robert Foote '83

Gregory D. Geist '72

**Rebecca E. &
Keith E. Krueger '86**

Sharon Magnuson '85

**Cynthia &
Michael M. Mueller**

**Sheila Griep Van Zandt '59 &
Edward F. Van Zandt '59**



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