

SMALLTALK

Winter 2022



SMALL
TALK
Winter 2022

**Department of
Microbiology**

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Updates across Microbiology

On the cover — This painting by **Leah Pantéa** illustrates a new discovery about SAR202's impact on the Earth's carbon cycle. The laughing cells represent SAR202, one of the most abundant cell types in ocean plankton. Members of the microbiology department have discovered enzymes that SAR202 use to "decode" complex mixtures, releasing carbon and energy for cells to use, and opening new possibilities for our understanding of the global carbon cycle.



From the Head

Steve Giovannoni

Microbiologists and friends,

Welcome to the 2022 edition of Small Talk. Despite its name, the immense global impact of microbiology and its role in society emerges in the tales told in these pages.

It is also the story of our lives -- the education, research and people that play out here in the microbiology department of Oregon State.

Throughout the pandemic, tight protocols enabled us to keep our labs open and our students making progress toward their degrees. The campus reopened last year -- resuming full in-person teaching and advising and gradually returning to normal social contact in our classrooms and laboratories.

But “normal” is a relative term.

Remote communication is here to stay. If you visit us, don't be surprised to see screens filled with familiar faces in our conference rooms, including our traveling scientists, who now check in from research sites around the world.

Our educational programs have grown to 920 undergraduate students and 42 graduate students. The relevance of microbiology to today's problems, the generosity of our alumni, and the incredible productivity and creativity of our faculty and student researchers have elevated us into the upper echelons among peer institutions.

This success is marked by the excellence of our seminar series, which brings outstanding scientists to Nash Hall on a regular basis. We anticipate continued growth in our on-campus programs and especially in our new online biohealth sciences undergraduate program,

which extends our teaching to students beyond the confines of campus.

As we grow, our community changes. This year we welcome three new advisors, Paul Broccolo, Luis Juarez and Katée Keen. We also bid farewell to Prof. Janine Trempy, who retired last summer, but still lends us her experience and skills on a part-time basis.

Janine's legacy includes her outstanding contributions to the mentorship of underrepresented minorities, her early rise as a champion of teaching skills and her significant research in food microbiology.

Ours is a shared experience that embraces diversity, welcoming people from everywhere into our programs and reaching out through art, partnerships with local communities and programs that promote microbiology education around the state.

You will read about these activities and our commitment to a better future for all in the pages of Small Talk. You will also read about the impacts of our research on the growth of knowledge about animal disease, landscapes and ecology, microbiomes and human health, and global biogeochemical processes altered by climate change.

In this time of the rolling year, share our joy in our enduring legacy: the students who found doors to their futures in our classrooms and laboratories.



We acknowledge that Oregon State University in Corvallis, OR is located within the traditional homelands of the Mary's River or Ampinefu Band of Kalapuya. Following the Willamette Valley Treaty of 1855 (Kalapuya etc. Treaty), Kalapuya people were forcibly removed to reservations in Western Oregon. Today, living descendants of these people are a part of the Confederated Tribes of Grand Ronde Community of Oregon (grandronde.org) and the Confederated Tribes of the Siletz Indians (ctsi.nsn.us)

Making Waves

Faculty updates

Excellence in microbiology indeed!

Kimberly Halsey has been appointed as the inaugural Excellence in Microbiology Faculty Scholar. In the courses she teaches, Halsey aims to enhance student engagement and curiosity. In spring 2023 she will teach a new Honors microbiology course that incorporates data analysis and interpretation to help students create connections between microbiological concepts and their own experiences.

Startup for the gut-brain connection

Assistant Professor **Maude David** has founded a startup to focus on the effect of gut microbes on autism and anxiety. Microbiome Engineering (previously called Enoveo USA) team members explore potential therapies for autism by identifying differences within the microbiome of neurotypical children and those on the autism spectrum. The startup gained momentum from \$1.94M from the second phase of a 2019 Small Business Innovation Research grant.

Microbiome Engineering is developing a gut brain chip that serves as a screening tool to rapidly assess the impact of gut microbiota metabolites on issues such as autism, depression and cognition. David received a \$125K SciRIS grant from the College of Science to support this work.



Jerri Bartholomew, Virginia Weis, Rebecca Vega Thurber, Denise Silva, Ruth Milston-Clements

David's research has helped to establish Oregon State as a leading institution for research related to the gut-brain axis.

Biotech fellowship takes postdoc to California

Postdoctoral researcher **Veronika Kivenson** received a 2022 Tory Burch Entrepreneur Fellowship at the Innovative Genomics Institute in Berkeley, Calif. The fellowship supports scientists whose work involves the development of solutions to global problems while promoting gender equity in the biotech industry.

Kivenson has been studying the nature of genetic code expansion in microorganisms and its applications in health and the environment. She will build on this research for her one-year fellowship to develop new microbiome-inspired therapeutics focused on the link between diet and heart disease.

Research Funding

Andrew Thurber was awarded a \$1.2M National Science Foundation CAREER Award to study the microbes that eat methane in Antarctica to inform how the marine microbiome

keeps this potent greenhouse gas out of the atmosphere.

This award partners with a cinematographer, a painter and an Oregon educator to translate microbiology to a broad audience and involves a variety of OSU students and postdocs, including **Rowan McLachlan** and **Lila Ardor Bellucci**. As part of the grant, Thurber and the artists plan to present on the science and the interface of science and art to a diverse group of K-12 students in Oakland, Calif.

Stephen Atkinson and **Jerri Bartholomew**, with Israeli colleague Tamar Lotan from the University of Haifa, Israel, were awarded a three-year, \$310K Binational Agricultural Research and Development Fund grant to study how fish parasites sense and sting their fish hosts. The goal is to characterize host sensing and signaling mechanisms in the hopes of preventing infection. This award supports master's student **Laila Brubaker**.

Ryan Mueller and **Fiona Tomas Nash** received \$119K as part of the Margaret A. Davidson Fellowship Program from

NOAA to support the research of master's student, Lara Breittkretz, who is evaluating the recovery potential of eelgrass from seed banks in the South Slough National Estuarine Research Reserve.

Sascha Hallett and **Julie Alexander** received \$124K through the Oregon Department of Fish and Wildlife's Fish Health Graduate Research Fellowship in Microbiology to support master's student **Hayden Krause** and study pathogens of salmon between and above the dams in the Upper Klamath Basin to inform fish disease dynamics following dam removal.

The Schuster Lab was awarded \$711K from the National Science Foundation to study the mechanisms of bacterial communication. The grant supports doctoral students **Parker Smith** and **Bryan Lynn** and master's degree student **Bryce Pettit Estell**.

Internal grants boost discovery and impact

Microbiology faculty received several grants through the College of Science's internal Research and Innovation Seed, or SciRIS, program, which funds high impact collaborative proposals that build teams, pursue fundamental discoveries and create societal impact.

In 2021, microbiologists **Rebecca Vega Thurber**, **Jerri Bartholomew**, **Denise Silva**, **Ruth Milston-Clements** and marine biologist Virginia Weis received a \$10K SciRIS award to develop a model tropical reef facility within OSU's world-renowned John L. Fryer Aquatic Animal Health Lab.

The model allows College of Science researchers across biology, chemistry and ecology to perform highly controlled, repeatable experiments on reef ecosystems. The facility will also serve as an outreach platform, bringing

awareness of far-off ecosystems to the local community. By interacting with the lab, citizens will learn about how humans affect these fragile habitats and how they personally can potentially mitigate and reverse reef decline.

In 2022, **Claudia Hase** received a \$10K SciRIS grant for a project to develop a model system for understanding population and co-evolutionary host-pathogen-hyper pathogen dynamics in oysters.

Stephen Giovannoni, along with marine ecologist Francis Chan, received a \$75K SciRIS award in 2022 to study the impact of hypoxia on dissolved organic matter. They will also examine microbial community

structure and function. Their research could help scientists predict hypoxic events on the Oregon Coast – increasing resiliency and helping shape climate policies.

Building on a previous SciRIS grant, **Kimberly Halsey**, along with Research Associate **James Fox** and statistician Duo Jiang, received a \$75K SciRIS grant to work with three Oregon water utilities and the Oregon Department of Environmental Quality to develop an automated system to provide early warnings of toxic harmful algal blooms and volatile organic compounds in real time. Developing lake or regional early-warning detection systems would help agencies more efficiently protect the environment and human health.

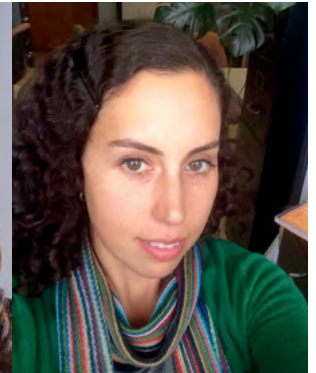
Kimberly Halsey



Maude David



Veronika Kivenson



Hayden Krause, M.S. student and ODFW Grad Research Fellow, collects water samples



Bright Minds, Bold Moves

Student news



Bruno Salas Garcia

CAMP gave micro major confidence to try new things

Bruno Salas Garcia (MB '22) found life as a microbiology major challenging at first. Then the aspiring dentist encountered a high school friend from his hometown in Irrigon, Oregon, who was part of the College Assistance Migrant Program (CAMP).

The federally funded program supports students from migrant and seasonal farmworker families during their first year in college. Through CAMP, Garcia was assigned a peer mentor who understood his cultural experience as a first-generation college student and

the difficulties of transitioning from a rural community to a large university. "CAMP helped me feel more at home at Oregon State, and from there, it gave me the confidence to go and try all these other things," he said.

One of those things was becoming a teaching assistant in some of the same microbiology classes where he struggled early on. "I got to see students progress from 'I don't know how to use a microscope at all' to being able to pick out what we're trying to find on the slide by the end of the term and also troubleshoot their own problems they had with the microscope or material," he said.



A chance encounter leads to a new life path

Cody Fretwell ('22) was a biohealth sciences major who planned to be a physician's assistant. Then he shadowed a surgeon at Oregon Health & Science University and saw

the critical role the medical device representative played in the operating room. The experience changed the course of Fretwell's education.

"I thought, 'OK, this is what I want to do for the rest of my life,'" he said.

Fretwell talked with his adviser, Tiffany Bolman, who had previously worked in the medical device industry, and decided to devote his career to selling medical devices.

Down the line, he plans to participate in research and development as well as sales. "My goal with medical device sales is to enhance someone's quality of life."

Fretwell said he found his classes as a biohealth sciences major invaluable for his future. "One of my favorite courses was microbiology, specifically because of the labs and because of **Allison Evans**," the course instructor. "I love her. She is the nicest human being I've ever met. She genuinely cares about you," Fretwell said.



This future dentist didn't let obstacles get in her way

Gabriela Cortes (BHS '22) is one of a growing number of first-generation students at OSU. She is proud not to have let any obstacle, including a pandemic or the challenges of a first-generation student, hold her back from earning her biohealth sciences degree this year. The aspiring dentist

placed on the OSU honor roll three times and was awarded two grants and three scholarships for her two years at OSU and her previous two years at Chemeketa Community College.

She said she plans to take two gap years during which time she plans to enroll in a dental assisting program and apply to dental schools, including Oregon Health Sciences University. "After I go to dental school, I want to help people who can't afford dental insurance. I want to offer services to those people one way or another."



Summer research leads to a new line of questioning

Honors biohealth sciences senior **Breanna Repp** spent 11 weeks in summer 2021 as a full-time paid researcher through the College of Science's SURE Science program. Working with a faculty mentor from the College of Public Health and Human Sciences, Repp explored the connections between alcoholism and lung cancer risk. "With SURE, I was basically learning how to do research," she said. She is now building on her experience for her Honors thesis, where she is digging into other unexplored factors that affect health outcomes, particularly related to maternal mortality.

In the course of her epidemiology research, Repp came across the fact that the United States has the highest maternal mortality rate among developed countries. "It's

something you don't hear about, and it's very alarming," said Repp. Repp is considering a master's in public health in addition to medical school, so she can one day have a voice in changing policy and making a difference on a systems level.



Former cosmetologist flourished through microbiology

Kendra Krebs (MB '21) was bleaching a customer's hair as a stylist when she was inspired to find out what chemicals caused the pigment to lift. She realized then that science might be more compelling to her than it had been back in high school.

Krebs, 37, grew up in Salem, Oregon, and attended Salem Academy before pursuing her cosmetology certification. When she returned to college, she chose OSU because of its science program, and once she found her way in the microbiology department, she flourished. She landed a research position in Deidre Johns' lab in the Carlson College of Veterinary Medicine working on *Neisseria gonorrhoeae*.

Krebs was also the president of the pre-osteopathic medicine student association at OSU and hopes to become a doctor to underserved communities and senior citizens. "My experience at Oregon State has been absolutely the best that I could have imagined. I have had opportunity after opportunity."

Welcome, New Graduate Students!

Our department has welcomed two classes of graduate students since our 2020 newsletter.



Hawra Almubarak



Laila Brubaker



Elliott Cameron



Bryce Pettit Estell



Caroline Hernandez



Pear Intasin

Safa Alfattani (Ph.D. Sarker Lab) has a M.S. from King Abdulaziz University in Saudi Arabia. “My research focuses on the inhibitory effects of natural antimicrobial products against germination, outgrowth and vegetative growth of spores of *Clostridium perfringens* in meat products.”

Hawra Almubarak (Ph.D. Halsey Lab) joined OSU after earning a M.S. from Western Illinois University. “My research will focus on understanding the metabolic processes leading to volatile organic compounds production in algae.”

Ted Bambakidis (Ph.D. Crump Lab) “Our work aims to understand how microbial communities are influenced by the landscape, transport and transform carbon, and shift in time, space and function from headwaters to the ocean.”

Elizabeth Brennan (Accelerated M.S. Giovannoni Lab) “My project looks into the unknown mechanisms and rates of Vitamin B1 cycling in microbial communities in the oceans.”

Laila Brubaker (M.S. Atkinson Lab) earned her B.S. from St. Olaf College in Minnesota. “My research focuses on the sensing and signaling mechanisms that the parasite *C. shasta* uses to infect its fish host.”

Elliott Cameron (M.S. Alexander Lab) earned his M.A. in teaching from Lewis & Clark College. “I am interested in disease ecology, and my current research focuses on two host-parasite relationships in the Klamath River basin.”

Jessica Chen (Non-thesis M.S. Vega Thurber Lab) “I am interested

in microbiology as it relates to human health.”

Nilanjana Das (M.S. Hallett Lab) earned her B.S. from Stockton University in New Jersey. “My research focuses on the epidemiology of proliferative kidney disease, caused by the myxozoan parasite *Tetracapsuloides bryosalmonae*, within Oregon’s fish hatcheries as well as state-wide.”

Connor Draney (Ph.D. Rowe Lab) has a B.S. from New Mexico State University. “My research will focus on direct interaction and co-infection of pathogenic viruses and bacteria. Specifically, I will investigate viral and bacterial interactions within the host and how these interactions affect transmission and severity of infection.”

Bryce Pettit Estell (M.S. Schuster Lab) earned his B.S. from Western Washington University. “My research will investigate the cooperation and collaboration of microbes using *Pseudomonas aeruginosa* as a model organism and factors related to quorum sensing using a chemostat setup.”

Sadie Grant (Ph.D. Mueller Lab) earned her B.S. from the UC Santa Cruz. “I am interested in optimization of the methods we use to study the microbiome and working at the intersection of microbiology and genomics to understand the mechanisms that modulate our internal ecosystems.”

Caroline Hernandez (Ph.D. David Lab) comes to OSU after earning a B.S. from the University of Illinois at Urbana-Champaign. “My research will examine the impact of specific microbial taxa on mice behavioral phenotypes and the mechanism by which gut microbiota send signals to the brain through enteroendocrine cell and vagal neuron interactions.”

Pear Intasin (M.S. Kaur Lab) earned her B.S. from Carleton College. “Currently, my work involves the use of high throughput multiplex PCR to detect alkaloid-producing endophytes in perennial ryegrass by targeting genes within alkaloid biosynthesis loci.”

Mackenzie Kawahara (Ph.D. Vega Thurber Lab) earned her B.S. from UC Davis. “I am interested in long-term effects of nutrient enrichment on the

microbiome dynamics and resilience of corals that live in highly oligotrophic habitats.” Kawahara received the Jill V. Josselyn Endowed Scholar Award from ARCS Foundation Oregon in 2022.

Hayden Krause (M.S. Hallett/Alexander Lab) has a B.S. from the College of Idaho. “My current project focuses on six pathogens (bacterial and parasitic) that impact salmonid health and their distribution/abundance prior to the removal of four dams in the Klamath River Basin.”

Laura Nutter (Ph.D. Rowe Lab) earned her B.S. from the University of Idaho. “My research centers around biofilms formed during middle ear infections. I am looking at the interactions that occur between *S. pneumoniae*, *M. catarrhalis*, *H. influenzae*, and influenza A virus in a biofilm environment.”

Sunni Patton (Ph.D. Vega Thurber Lab) graduated from Georgia State University in 2019 with her B.S. “My work focuses on understanding microbiome resilience and sensitivity in response to environmental stressors in the endangered Caribbean coral, *Acropora cervicornis*.” Patton received the Jill V. Josselyn Endowed Scholar Award from ARCS Foundation Oregon in 2021.

Kevin Rice (Ph.D. Thurber Lab) earned his B.S. from the University of Nebraska – Lincoln. “My research involves characterizing sulfur-reducing bacteria and processes in an Antarctic methane seep. Specifically, I want

to understand how the microbial community diversifies and develops over time.”

Ebony Stretch (Ph.D. Sharpton Lab) has a B.S. from California State University at San Marcos. “I am cultivating my bioinformatics and statistical skills to gain further insight on the behavior of bacteria, viruses and parasites.” Stretch is also one of 17 Provost Distinguished Graduate Fellows at Oregon State.

Samantha Varada (Accelerated M.S. David Lab) “My research focuses on exploring the mechanisms of the gut-brain-axis and the immunomodulatory properties of commensal microbes.”

Eddie Fuques Villalba (Ph.D. Vega Thurber Lab) has a M.S. degree from Universidad de la Republica in Montevideo, Uruguay. “By using metagenomic and meta-transcriptomic approaches I will be studying both viral and bacterial diversity in coral reef ecosystems in order to understand the role that microorganisms play in these threatened habitats and contribute to marine species conservation.”

Jacob Wynne (Ph.D. Thurber Lab) earned his B.S. from Virginia Polytechnic Institute. “My research focuses on the microbiomes of methane seeps in polar regions and the deep sea.”



Mackenzie Kawahara



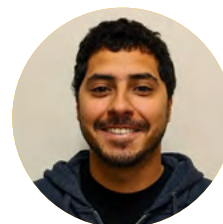
Hayden Krause



Laura Nutter



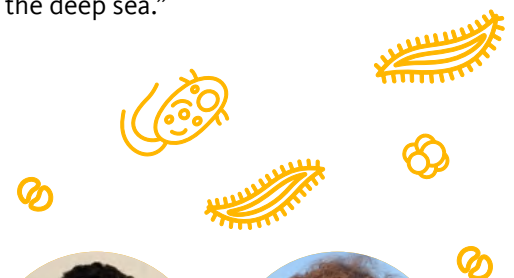
Kevin Rice



Eddie Fuques Villalba



Jacob Wynne





Graduate Student Success

The International Society for Microbial Ecology symposium (see p. 21): From left: Eric Moore (alumnus), Grace Deitzler, Christine Tataru, Emily Schmeltzer, Savannah Leidholt, Adrianna Messyaz (alumna).

Decoding the gut – and getting awarded for it

Ph.D. student **Christine Tataru** won the 2021-22 Larry W. Martin & Joyce B. O'Neill Endowed Fellowship in the College of Science for her work creating computer models to understand how gut microbiomes affect their human hosts.

Tataru's current work uses natural language-based algorithms to investigate the relationships between microbes that keep our guts healthy, or, alternatively, lead to inflammatory bowel disease. "We want to holistically define the microbiome, to get at the underlying processes defining which taxa are present," she said.

Composing clouds in the ocean

Ph.D. student **Vaishnavi Padaki** received an OSU Art-Sci Fellowship, which offers students the opportunity

to explore the intersection of arts and sciences over a one-year period. Padaki works in the Halsey Lab and seeks to raise awareness of the environmental elements that control atmospheric gases and illustrate seasonal changes in plankton and the volatile organic compounds (VOCs) they mediate in the surface ocean.

For her fellowship, she will create a glass sculpture called 'Composing clouds in the ocean' using both glass and digital art using R programming that explains how ocean layers create niches where different plankton interact and yield VOCs that can be emitted into the atmosphere at the sea-air interface. "It is important to me to have this fellowship because it allows me to communicate science to a wide range of audiences who will appreciate the significance of VOCs," said Padaki.



Award-winning and Alaska-bound

Ph.D. student **Ben Americus** was selected for a 2022-23 Alaska Sea Grant State Fellowship where he is currently working as a Science Policy Coordinator for the Alaska Fisheries Development Foundation. "I've been studying different forms of salmon aquaculture, from fish farms in Chile to the conservation hatcheries in Oregon, to the production hatcheries in Alaska and Asia. The last six months have given me a more worldly view of the salmon industry," said Americus.

In September 2022, Americus and Jerri Bartholomew attended the International Symposium on Aquatic Animal Health (ISAAH 9) in Santiago, Chile. Americus was awarded best student oral presentation for his research on how fish parasites reproduce inside their hosts. In addition, he received an American Fisheries Society-Fish Health Section Snieszko Student Travel Award to attend the conference and tour Atlantic salmon farms in Patagonia.



Celebrating recent grads

Congratulations to our graduates in the classes of 2021 and 2022!

CLASS OF 2021

Hanna Kehlet-Delgado (Mueller) defended her Ph.D. on comparative genomics of vibrio and characterizing microbial communities at a shellfish hatchery. She's now a postdoctoral research associate in the plant pathology program at Washington State University in Pullman.

Priyanka Singla (David) is currently a research associate at the OHSU Knight Cancer Institute.

Rebecca Maher's (Vega Thurber) Ph.D. dissertation focused on stressors that drive changes in coral microbiome diversity and composition. She is currently a postdoctoral scholar in the Bohannon Lab at the University of Oregon Institute of Ecology and Evolution.

After finishing her accelerated master's, **Erica (Rickie) Ewton** (Thurber) enrolled as a Ph.D. student in the Menden-Deuer Lab at the University of Rhode Island Graduate School of Oceanography.

Grace Klinges (Vega Thurber) completed her Ph.D. on coral health and disease susceptibility. She is now a postdoctoral research fellow at the Mote Marine Laboratory in Key West, Florida.

Adriana Messyasz's (Vega Thurber) Ph.D. focused on discovering novel roles of microbes and how they contribute to host health. She is now a postdoctoral associate at Rutgers University.

CLASS OF 2022

Bryce Penta (Halsey) honed his data science skills for his Ph.D. and is now a senior data scientist focusing on business and portfolio forecasting at Enova International.

Corbin Schuster (Kent) is now an assistant professor of microbiology at Heritage University in Toppenish, Washington and a postdoctoral scholar in the Westerfield Lab at the University of Oregon Institute of Neuroscience.

Mylene Gorzynski (Danelishvili) completed her accelerated M.S. and is currently a Ph.D. student in medical microbiology and bacteriology at the Boston University School of Medicine.

After completing her master's degree, **Alexandra Phillips** (David) is now a research assistant at Molecular Testing Labs in Vancouver, Washington.

Jayanthi Joseph (Bermudez) focused her Ph.D. research on the interactions between the host immune system and mycobacteria. She is currently a staff scientist at xBiologix.



Hannah Kehlet-Delgado



Priyanka Singla



Erica (Rickie) Ewton



Grace Klinges



Adriana Messyasz



Bryce Penta



Corbin Schuster



Jayanthi Joseph

Congratulations graduate award recipients!

Debbie S. Bellinghausen Microbiology Student Support Award
Sunni Patton, 2022

Robert and Clarice MacVicar Animal Health Scholarship
Ben Americus, 2021
Savanah Leidholt, 2022

Eugene W. Seitz Microbiology Ph.D. Support Scholarship
Ben Americus, 2021

Mark H. Middlekauf Outstanding Graduate Teaching and Service Award
Jessica Buser, 2021

Mark H. Middlekauf Outstanding Graduate Achievement Award
Christine Tataru and Sarah Wolf, 2021

Mark H. Middlekauf Scholarship
Eddie Fuques Villalba and Ebony Stretch, 2021

Excellence in Microbiology Scholarship
Jayanthi Joseph, 2021
Lindsay Collart, 2022

Margaret E. & Charles Black Scholarship
Jayanthi Joseph, 2021

Dick and Toshi Morita Scholarship
Mary (MK) English and Kelly Shannon, 2021

Tartar Microbiology Fellowship
Eddie Fuques Villalba and Austin Hammer, 2022

Sheila van Zandt Research Experience
Sarah Wolf and Christine Tataru, 2021
Parker Smith and Caroline Hernandez, 2022

OSU Provost Fellowship / Scholarship
Ebony Stretch, 2021
Sadie Grant and Jacob Wynne, 2022

Wei Family Foundation Scholarship
Laila Brubaker, 2022



Breaking Down Barriers

to a Future in Science



Microbiology graduate student **Savannah Leidholt** understands the importance of diversity.

As an undergraduate at Montana State University-Bozeman, Leidholt was a McNair Scholar, a program funded through the U.S. Department of Education to increase graduate degree awards for students from first-generation or underrepresented segments of society.

You could say the program had an impact: Leidholt joined Rebecca Vega Thurber's lab as an incoming Ph.D. student in 2019.

Now, she is helping to create similar opportunities for other young people. Just as microbial diversity is fundamental to the maintenance and conservation of global genetic resources, academic diversity is equally important, Leidholt said.

"As a Hispanic woman who grew up in rural Montana, I can attest firsthand to the lack of STEM opportunities available for these demographics," she said.

This past summer, Leidholt set out to create a summer "bootcamp" for area high school students to draw more students from BIPOC, LGBTQ+, low-income and other diverse backgrounds to the study of microbiology.

For one week, Leidholt led 20 local high school students through the Pernot Microbiology Camp. The immersion camp, funded by **Rebecca Vega Thurber**, introduced students to microbiology disciplines such as agricultural, food, medicinal and marine science.

The students learned how to use pipettes, the small glass or plastic tubes used in labs. They also collected cheek cell swabs, extracted DNA from potato salads, toured Corvallis' wastewater facility and applied microbiology to arts and crafts.

The program was named after and funded in part by Vega Thurber's endowed position in the department. Vega Thurber is the Emile F. Pernot Distinguished Professor in the microbiology department, a three-year professorship named after Oregon State University's first bacteriologist and one of the founders of the Department of Microbiology at OSU.

"I know from my time as a McNair Scholar in undergraduate school that targeted programs such as the Pernot Microbiology camp can foster self-confidence in the sciences and increased interest in pursuing a career in STEM," she added.

Participating students were primarily incoming juniors and seniors from Linn-Benton County and represented a variety of backgrounds in terms of race, ethnicity, gender and family income.

"I'm changing my major from general biology to microbiology when I go to orientation," said a high school senior heading to the University of Oregon in the fall.

"I definitely am keeping my education path open to unplanned opportunities especially in regards to the field of

microbiology," another student said in a survey after the camp.

Leidholt said many of the students were able to attend because the microbiology department provided transportation.

"Ellie Boryer and I did extensive research into similar STEM camps," she said. "We found that the biggest inhibitors for students of color were transportation and financial costs. We chose to eliminate both by providing a ride to and from the camp as well as giving stipends to all targeted students."

Several members of the microbiology department volunteered to not only transport the students, but also act as mentors to guide students through daily lab exercises, field trips and other activities.

Students are introduced to the diversity of the microbial world, learning how some microbes shape Earth's habitability while others are used to ferment food and beverages.

They practiced how to probe microbial communities using cultivation-dependent techniques such as plate streaking as well as cultivation-independent techniques such as genome sequencing.

Volunteers at Oregon State University and Corvallis' wastewater treatment plant showed students how these techniques are used daily in meat-processing facilities, medical labs and aquatic research labs.

Students were familiarized with microbiology and the wide range of potential career paths possible with a microbiology degree.

Whether the students ultimately major in microbiology or not,

Leidholt said the camp succeeded in making microbiology more accessible and inclusive.

"This camp aimed to give students an opportunity to learn about the wide field of microbiology through a lived experience," said Rebecca Vega Thurber. "We eliminated many financial, logistical and conceptual barriers young students (particularly students of color) face by providing transportation and student stipends."

Vega Thurber credits the success of the STEM bootcamp to the hard work of the volunteers as well as the financial support she receives through the Pernot Fund, the microbiology department and other donors, such as \$3K they received from the Marine Studies Award Initiative at OSU.

"These early experiential learning programs can make a huge difference in the lives of early career scientists," Vega Thurber said. "I'm looking forward to continuing and ideally expanding the program in the future."

Several students expressed that they found the experience life-changing.

"I would love to get a master's or even doctorate degree in microbiology, whether that is while I am in med school or completely change my career path to just wanting to work as a full-time microbiologist," said one such student.

"After this camp, a career as a researcher in microbiology seems more appealing than ever."

"I am definitely more interested and educated about the options that I can pursue with science, so I think I am more likely to try something with a science degree," said the student.

Big Discoveries

Microbiology research updates



Ryan Mueller



Brandon Kieft



Stephen Giovannoni



Kimberly Halsey



Theo Dreher



Julie Alexander

Even oysters need probiotics

Ryan Mueller helped discover that giving oyster larvae probiotics significantly boosted their survival rates. The researchers found that with only a one-time application, the probiotics also boosted larval growth, metamorphosis and settlement. In addition to more oysters surviving past the larvae stage, they also fared better at transitioning to juveniles and anchoring to shells and other surfaces.

The findings, published in *Aquaculture* in November 2022, could be a major boon to oyster farms where pathogens can kill off a whole season's worth of larvae, costing hundreds of thousands of dollars.

"Just a 40-50% improvement in larvae survival would be huge, but here we

have over 80% increased survival at times," said Carla Schubiger, project leader and assistant professor of veterinary medicine. "That's very, very significant."

Oyster sales account for close to \$5M annually in Oregon, according to a 2010 report from the Pacific Coast Shellfish Growers Association.

Shedding new light on carbon cycling

Ryan Mueller and alumnus **Brandon Kieft** (Ph.D. '14) led a study published in the *Proceedings of the National Academy of Sciences* that has shed new light on the mechanisms of carbon cycling in the ocean.

Using stable isotope labeling they tracked carbon as it made its way into the organic matter produced

by common phytoplankton and, ultimately, the heterotrophic microbes that consume it. The isotopes told them which organisms were eating diatoms and which were consuming cyanobacteria, two species of phytoplankton that combine to produce a majority of the ocean's fixed carbon.

Their efforts represent an important step toward forecasting how much carbon will leave the ocean for the atmosphere as greenhouse gas carbon dioxide and how much will end up entombed in marine sediments.

Gas-passing plankton illuminate another piece of the carbon cycle puzzle

More than 30 years ago, microbiologist **Stephen Giovannoni** first discovered a bacteria called SAR11 — the smallest

but most bountiful free-living cell in the ocean. In fact, SAR11's combined weight exceeds that of all the fish in the ocean, and through sheer numbers, plays a huge role in the ocean's carbon cycling.

In 2021, **Kimberly Halsey** revealed that SAR11 consumes the gases acetone and isoprene in addition to carbon. This is important because if they escape into the atmosphere, they can react chemically to form aerosol particles that can precipitate rain, ice and snow formation.

Acetone and other volatile organic compounds (VOCs) are produced by phytoplankton, microscopic marine algae, and are abundant in the surface ocean, from which they can move into the atmosphere and influence climate.

"It's important to understand SAR11 and other bacteria's potential to control the emission of climate-active gases because it helps our overall understanding of climate change and stability. We know that there are hidden aspects of the carbon cycle that need further study before we can understand the movement of carbon through biological systems in the ocean," said Halsey. The findings were published in *Environmental Microbiology*.

Solving the Salem mystery

Theo Dreher, an emeritus professor in microbiology, led a study that helped determine what fouled the drinking water four years ago in Oregon's capital city of Salem.

The study revealed the precise types of toxins produced by specific organisms and involved sampling of cyanobacterial blooms from 10 Oregon lakes including Detroit Reservoir, which provides drinking water for Salem.

Genome sequencing and toxin analyses enabled Dreher and his colleagues to solve the mystery behind Salem's water problem.

"Two toxin-producing *Dolichospermum* cyanobacteria were present in Detroit Reservoir, one producing a type of cylindrospermopsin and another producing an uncommon

form of microcystin," Dreher said. "Occurrences of toxins had been known previously, but now we know the precise toxin types and the organisms making them."

Harmful algal blooms, often abbreviated to HABs, can form at any time of the year but most often between spring and fall.



Crossing the final hurdle for the Klamath

Through the more than decade-long process, the final hurdle to a free-flowing Klamath was crossed in November 2022 when the Federal Energy Regulatory Commission approved the removal of the lower four dams on the Klamath River in Oregon and California.

The settlement agreement involved both states, the Yurok and Kurok Tribes, Berkshire Hathaway Energy-owned utility PacifiCorp, fishing groups and other stakeholders. The largest dam removal in U.S. history will commence summer 2023 and continue into 2024. The Klamath Basin was once the third-largest salmon-producing river on the West Coast. But the dams, constructed between 1918 and 1962, cut the river off from the ocean, preventing

salmon from reaching spawning grounds upstream. The dam removal will reopen 400 miles of habitat.

As salmon move further upstream, so might the parasites that live in and around them. In a three-and-a-half-year partnership with the Yurok Tribe, **Julie Alexander** will study changes to and connections between the Klamath's water quality, water use and the aquatic food web as the dams are removed. Alexander teams up with project leader Desiree Tullos, professor of water resource engineering, to help make quantitative decisions based on both ecological science and Indigenous knowledge.

The work is funded by an \$870K award from Oregon Sea Grant.



Left to right: Brennan, Briggs, Chen, Churchill, Dawson, Donner, James, Johnston

Congratulations!



Congratulations to the microbiology (MB) and biohealth science (BHS) students who graduated since the last newsletter. In 2021, 195 undergraduates graduated with MB or BHS degrees, and in 2022, we had 177 graduates. We honor their hard work, perseverance and many accomplishments. Below are some of the favorite memories and future plans of the class of 2022:

Elizabeth Brennan (MB) also majored in theater arts and loved “getting to switch between my analytical and creative sides. I am happy to have gotten to work in a lab and run my own experiments, as well as be on the creative teams of and act in many shows.” Elizabeth is now in the accelerated master’s program in the department.

Hannah Briggs (Honors BHS) loved learning about the world of microbiology. “It was so fun being able to connect my learning with the world around me – like how my body

functions, how germ and microbes can change our biomes and how science is constantly evolving.” She is currently pursuing her master’s in public health at Oregon State.

Jasmin Chen (BHS) appreciated the dedicated faculty and advisors in the College of Science. “My mentor Tiffany Bolman and Chemistry Instructor Daniel Myles were my favorites because they were so accommodating and always put their students first.” She plans to enroll in pharmacy school in the future.

Carmen Churchill (BHS) was in the Oregon State Marching Band. “Some of my favorite memories are playing at football and basketball games with my friends. The energy of the crowd was invigorating and something I will never forget.” Linda Bruslind was her favorite professor “due to her straightforward teaching style and friendly nature.” She plans to apply to naturopathic medicine schools after taking a gap year.

Samantha Dawson (MB) developed a love for microbiology at Oregon State: “My major helped me find particular niches of science that I loved. It also gave me hands-on experience in lab environments, allowing me to learn so much.” Samantha is now a research scientist at Seattle Children’s Research Institute and appreciates gaining some real world experience before enrolling in graduate school in the future.

Brianna Donner (Honors BHS) is currently preparing her medical school application. “I really loved being around so many like-minded people who are just as fascinated with science as I am. The faculty in this department are also super supportive and genuinely cared about helping out whenever I was in need.” Her favorite memories consist of enjoying the beautiful OSU campus.

Teagan James (Honors BHS) said her favorite memory at OSU was “being involved in undergraduate research and having the opportunity

to present my research at multiple regional conferences.” She is working as a medical scribe as she prepares her medical school application.

Rachael Johnston (BHS) enjoyed how her classes built off each other. “I will be attending Oregon State’s Doctor of Pharmacy program in the fall of this year, and hope to become an oncology pharmacist.”

Lauren Murphy (BHS) played golf for the OSU women’s golf team. She plans to attend medical school in the future. “I am grateful for the diversity of scientific knowledge I gained and found a particular interest in how microbes influence human health and disease.” Her favorite professors were Rebecca Vega Thurber and her advisor, Shawn Massoni.

Vivian Ngo (BHS) enjoyed the diversity of the science she studied for her degree. Despite all the work, it was actually a holistic and

worthwhile experience to be able to learn a little bit of everything.” Her favorite memory was getting accepted to OSU’s College of Pharmacy.

Michelle Nguyen (Honors BHS) enjoyed being able to take a wide variety of different science classes. She is now enrolled in Pacific University’s College of Optometry.

Danielle Pedersen (BHS) enjoyed learning more about microbiology and human biology. Her favorite memory was finishing her degree with a newborn baby! She hopes to become a doctor or surgeon in the future.

McKenna Presley (BHS) loved learning more about “science related to humans” and plans to attend medical school in the future.

Levi Silbernagel’s (BHS) favorite memory was going to nationals with the Oregon State Club Baseball team. He plans to apply to medical school.

Shaenna Soon (BHS) is enrolled in the OSU/OHSU College of Pharmacy. “I enjoyed learning from and building connections with my professors. They were so helpful and made me more confident in my abilities.”

Hannah Sosa (BHS) loved her anatomy and physiology lab at Oregon State. “I found working with the donors to be such a unique experience and an awesome learning tool.” She is now in pharmacy school at the University of Colorado.

Decker Tovey (BHS) appreciated that his major allowed him to collaborate with students from diverse backgrounds “but who had a similar end goal as my own. Health care requires a deep understanding of how living organisms operate and regulate. Oregon State gave me the opportunity to expand my mind beyond what I thought was possible.” He is now in a doctor of chiropractic program at Parker University in Dallas, TX.

Classes of 2021 & 2022



Left to right: Murphy, Ngo, Nguyen, Pedersen, Presley, Silbernagel, Soon, Sosa and Tovey



Meet the Bergs

Out of a desire to give back, Microbiology alumni endow new lecture series

Neither **Ron** nor **Ann Berg** is originally from Oregon, but taking a leap of faith to leave home and attend Oregon State University for graduate school changed their lives forever. Now, the couple is looking to give back to the institution that brought them together.

Ron Berg (M.S. '71, Ph.D. '74) grew up and attended college in San Jose, California.

His mentor at San Jose State, Dr. Jim Craig, had completed his Ph.D. at Oregon State and had encouraged Ron to apply. "Oregon State University was one of the few universities at the time offering graduate studies in applied and industrial microbiology," he said. Following his acceptance in the spring

of 1968, Ron began a journey that would lead to advanced degrees in microbiology under the guidance of Drs. Andy Anderson and Bill Sandine.

Fifteen months later, Ann Berg (nee Moran) graduated with her bachelor's degree in biology from Marymount Manhattan College in New York City, where she grew up. "With a biology major, the world is your oyster," she said. As an only child, though, she wanted more of an adventure for graduate school. "I decided it was time to leave home and follow Horace Greeley's advice 'Go West!'"

Her friend's father had been stationed at Camp Adair, an army base near Corvallis during WWII and talked fondly

of the Willamette Valley. So together, they decided to apply to Oregon State University. When Ann was admitted to the College of Science's graduate program in microbiology, she packed her bags and headed 2,000 miles west to start a life on the other side of the country. "And that's how I went from mid-town Manhattan to downtown Corvallis," she said.

Ann and Ron met in February of 1970 and attended an OSU-Stanford basketball game for their first date. Three months later they were engaged, and then married in 1971.

Ron received his Ph.D. in microbiology in 1974, and shortly after, they moved to Ohio so he could begin what would

be a long and satisfying 34-year career with Procter & Gamble, culminating in a role as worldwide microbiology technical leader for P&G's paper products. Much of his work involved a combination of microbiological and engineering skills. "A good deal of this background came from my experience at OSU. Not just microbiology, but also the ability to connect the dots, seeing and understanding complex relationships to solve unique problems," he said.

"I still haven't figured out what I want to be when I grow up," Ann said. While at OSU, she discovered her true passion lay in science education and changed her focus to a master's and teaching certificate. She completed her student teaching at Crescent Valley High School in Corvallis.

"When we moved from Corvallis to Ohio, I did some substitute teaching that turned into a one-year career as a biology teacher," she said. When their kids came along, Ann stayed home with them, and became actively involved in her local community. She then transitioned into a career in the trust department of a local community bank and ended up loving it.

Though they have lived in Ohio for several decades, Ron and Ann celebrated 50 years of marriage last year by returning to where it all started: the Willamette Valley and the microbiology department at Oregon State University. "We went on campus, ate at some restaurants and re-created some of our favorite dates," said Ann.

"Everything was still very recognizable," said Ron. While they were students, the microbiology department moved from the historic Agriculture Hall into a brand new teaching and research facility in what is now called Nash Hall. "That move was

quite interesting, moving into what was at the time a cutting-edge space."

Some of their favorite memories as students were the daffodils that bloom in February – a welcome harbinger of spring – and the group of friends they made with other co-ed graduate students in Ann's dorm in Sackett Hall. "There were graduate students not only from all over the United States, but from other countries as well," said Ann.

Wanting to give back to the institution that brought them together, the Bergs have endowed a new microbiology lecture series which will feature noted microbiologists from outside Oregon State University.

"The hope is for it to continue long after we're gone," said Ann, "as long as the university is there to continue this."

The inaugural Berg Lecture will host Dr. Jo Handelsman, director of the Wisconsin Institute for Discovery at the University of Wisconsin-Madison, on Friday, April 28, 2023. Handelsman previously served as a science advisor to President Obama as the associate director for science at the White House Office of Science and Technology Policy. She is the author of several books, a leader in education and a champion for increasing diversity in STEM.

"The generous gift from Ron and Ann Berg has enabled the Department of Microbiology to host such an inspirational leader in microbial ecology," said Associate Professor Kimberly Halsey. "Her dedication and impactful contributions to science, education, and inclusivity exemplify the qualities we value and aspire to nurture in our community."



Donor Honor Roll

The Honor Roll recognizes Microbiology supporters who have made cumulative gifts totaling \$1,000 or more between July 1, 2020, and June 30, 2022.

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Thank you!

Every attempt has been made to ensure the accuracy of these lists. However, if you notice an error, please contact Pam Powell, Director of Stewardship, OSU Foundation.

Pam.Powell@osufoundation.org
 or 541-737-5820.



Department News

A scientist's curiosity led to industry-transforming discovery

Janine Trempy does more than answer questions. She questions answers. Her questions help make our food last longer while being tastier and healthier.

Some bacterial species produce exopolysaccharide (EPS) in response to stress such as low moisture. Lactic acid bacteria (LAB) such as *Lactococcus*, *Lactobacillus* and *Leuconostoc* are widely used in the food, pharmaceutical and cosmetic industries.

EPS producing LAB improves the texture, taste and shelf life of food such as cheese and yogurt – creating smooth, creamy textures. It also improves the taste and smell of low-fat and nonfat cheese without increasing fat and increases the shelf life of sourdough bread as well.

The problem with using EPS producing LAB strains industrially is EPS production is unstable. Loss of EPS production is a significant financial concern. The prevailing belief was that

EPS producing LAB strains lost the ability to produce EPS because they lost their plasmids-containing genes coding for EPS enzymes.

Trempy challenged that belief. She asked if the instability of EPS production in LAB was truly due to loss of plasmid-borne EPS genes. Or might there be another explanation?

Her research yielded many discoveries, including that a natural LAB isolate produces a novel EPS called Ropy. Novel Ropy EPS provides a desired texture and taste in fermentation processes. It also thickens beverages, including lactose-free milk, non-fat and low-fat milk, almond milk and protein and diet formulated drinks.

“While many aspects of Ropy EPS gene structure and origin are still under investigation, what became clear from this research is that loss of EPS production and variability in EPS composition was not as simple as a bacterium losing a plasmid with EPS genes,” Trempy said.

Her research led to numerous domestic and international patents for OSU, including a U.S. patent titled Biopolymer Thickener. The patent protects, among other things, ways to thicken products with Ropy EPS for human consumption.

Chr. Hansen, a large global food and pharmaceutical company, signed a licensing agreement with OSU to create starter cultures containing the novel Ropy EPS producing LAB strain discovered by Trempy's research. After conducting sensory testing, the company plans to sell starter cultures with the novel Ropy EPS producing LAB strain to food companies all over the world – with OSU receiving the royalties.

“The novel Ropy EPS producing LAB strain, discovered in my research program, is being used in food and beverage fermentation globally, including by Oregon's very own Tillamook Creamery,” said Trempy.

“This is an exciting technology transfer outcome to basic molecular microbiology research that



also provided training to many undergraduate and graduate students and postdocs in my research program,” she added.

Trempey retired from the department in 2022 and continues her work with Ropy EPS as a professor emeritus.

The Art-Sci Initiative is alive and well

The microbiology department is an active member of Oregon State’s **Art-Sci Initiative**, a trans-disciplinary endeavor to unite faculty and students who are interested in the intersection of the arts and sciences.

For the first time ever, the Art-Sci Initiative has its first class of fellows, including Ph.D. student **Vaishnavi Padaki** (see p. 8). The eleven undergraduate and graduate

students from five different colleges at Oregon State are working on projects that combine their scientific interests with a specific art medium, ranging from photography to Chinese watercolor. Their final pieces will be exhibited in the Little Gallery in Kidder Hall in spring 2023. The Art-Sci Initiative hopes to expand the fellows program, pending additional support.

WHAT WILL NATURE DO?

In fall 2021, the Art-Sci group collaborated with Dr. Dominique Bachelet in the Department of Biological and Ecological Engineering in the College of Agricultural Sciences to tackle the question “What Will Nature Do?” This exhibit, held at The Arts Center in Corvallis, communicated hope for our planet in the face of climate change. In preparation for this exhibit, OSU researchers,

including **Jerri Bartholomew**, presented seminars that addressed climate change and the connections between art and science.

TAKING SALMONIDS ABSTRACT

In spring 2022, Bartholomew held an art exhibit in The Little Gallery in Kidder Hall entitled “Abstracted: Where science meets art and music.” The multimedia exhibit contrasted the scientific abstract with the artistic concept of abstraction.

The purpose of a scientific abstract is to distill the contents of a paper. Abstraction in art involves the use of shapes, colors and forms to create a composition that may, or may not, have a visual reference.

“As a microbiologist and artist, I am fascinated by what occurs at the intersection between these disciplines,” said Bartholomew. “I use glass as a medium to express the beauty of the natural world I study, and through collaborations with other artists and scientists, I explore ways to encourage that curiosity and wonder in others.”

“Being an artist has helped me, as a scientist, by providing a different perspective,” she said.

One part of the ‘Abstracted’ exhibit was a collaboration with visual artist Andy Myers and composer Dana Reason from OSU’s College of Liberal Arts in a video depicting the life cycle of the parasite *Ceratonova shasta* as it infects Pacific salmon. In the video, four musical movements by Reason serve as the backdrop for a live drawing by Myers as he imagines the parasite’s life cycle in the host as it transitions from one spore stage to the next, filling the gaps in our understanding of parasite development.

Watch the video at beav.es/5nb.



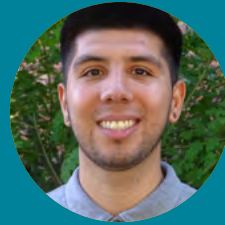
Amy Timshel



Katée Keen



Paul Broccolo



Luis Juarez

Fresh faces!

Amy Timshel took on Fulton's position in October last year. She previously served for 10 years as an accountant for the Washington County Sheriff's Office and as a docent at the Oregon Jewish Museum in Portland from 2010 to 2020.

Timshel has a bachelor's degree in international studies from the University of Oregon and an English degree from Oregon State as well as a master's degree in library science from Emporia University.

The department also welcomed three new academic advisors this past year.

Katée Keen arrived in September, coming from Landmark College in Putney, Vermont. Keen has been an academic advisor in several different colleges at OSU and has also worked with alumni.

“OSU has incredible students doing research, working toward their long-term academic goals and career aspirations,” Keen said.

“I am grateful to be a part of their educational journey while at OSU.”

Paul Broccolo joined the department in June. “I love advising, and I've been an academic advisor for the past 12 years,” Broccolo said. He moved to

Oregon from Arizona where he was working at Arizona State University as a senior academic advisor for the past six years. Prior to that, he worked as an advisor for seven years.

“I am really looking forward to a cooler, wetter climate and experiencing this thing called ‘seasons,’” he said about moving to the Northwest.

Luis Juarez, started during fall term. He came from Fresno, California, where he worked for Fresno State University's psychology department as an academic advisor. “Learning about the available opportunities for students and allowing them to gain hands-on experience shows the dedication that the department and OSU have for our students,” he said.

The future is Fulbright

Jerri Bartholomew spent a month at the Biology Center of the Czech Academy of Sciences in Ceské Budejovice in the Czech Republic in April 2022 as a Fulbright Specialist. While there, she presented a two-day workshop on science communications, helping students explore ways to communicate to different audiences, including using art as a communication medium. She also collaborated on fish parasitology research.

In April of 2023, Bartholomew heads to the Instituto de Acuicultura Torre de la Sal, Castellon, Spain, for three months to study fish parasitology for a second Fulbright award.



Fulton bids office farewell

Mary Fulton, assistant to the department head for 17 years, retired from the department in 2021. Fulton was ‘the heart and soul of the department,’ supporting multiple department heads, shepherding new faculty as they learned the ins and outs of the department and being the welcoming face for students. In addition, Mary coordinated many events on behalf of the department and the broader OSU community. In 2019 and 2008, she received the College of Science's Gladys Valley Award for Exemplary Administrative Support.

“Mary's determined and oftentimes singular effort to organize logistics for student recruitment activities, seminars, public lectures and community fundraisers has led to a vibrant microbiology research and training community at OSU, and facilitated our institution's reputation as a national leader in microbiome science,” said Rebecca Vega Thurber.

Out there

In August 2022, microbiology faculty, graduate students and alumni attended the International Society for Microbial Ecology symposium in Lausanne, Switzerland. Graduate students **Christine Tataru** and **Hannah Epstein**, as well as faculty member **Rebecca Vega Thurber**, presented their research.

Graduate students past and present from the Bartholomew Lab were united at the Western Fish Disease Workshop in Hood River, Oregon in May 2022. Graduate students **Nilanjana Das** and **Hayden Krause** presented posters. Ph.D. candidate **Ben Americus** along with **Sascha Hallett**, **Michael Kent** and alumnus **Corbin Schuster** ('22), presented at the conference.

Three microbiology faculty, **Sascha Hallett**, **Janine Trempy** and **Ruth Milston-Clements**, were among the volunteers thanked for their contributions to the success of the mass COVID-19 vaccination clinics at Reser Stadium in the spring of 2021. During the dozens of vaccination clinics, around 75K people received COVID-19 vaccinations and more than 9,500 volunteer hours were logged – a major turning point in the pandemic response.



Sascha Hallett, Janine Trempy and Ruth Milston-Clements standing in front of the thank you sign at Reser Stadium



Graduate students of the Bartholomew Lab. From left: Sascha Hallett, Hayden Krause, Maria Muller (visiting post-doc from Brazil), Nilanjana Das, Ben Americus, Sarah Bjork (ODFW), Jerri Bartholomew, Matt Stinson (NWIFC), Sean Roon (WDFW).



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Join Microbiology on Dam Proud Day!

On **April 26, 2023**, the microbiology department will be participating in Oregon State University's day of giving to raise funds for **new microscopes** for our student learning labs.

Follow us on Facebook on April 26 for exciting giving challenges to increase the impact of your gift. The microscopes our students use are in sore need of replacement. Won't you join us to help ensure our students have the best opportunities to explore the world of microbiology?



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