

COLLEGE OF SCIENCE

IMPACT

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In the face of climate change,
our scientists are hard at work.



Oregon State
University

IMPACT

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Oregon State University
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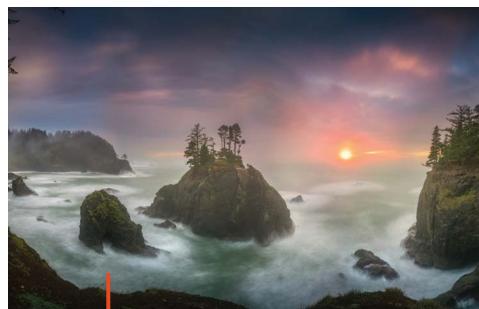
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From the Dean



I am honored to serve as interim dean of the College of Science this year as the search begins for a permanent dean. Roy Haggerty, dean of the College of Science since 2017, left in July to become executive vice president and provost at Louisiana State University.

I chose to serve in this role to advance the work our College has done together in the last two years in creating and implementing our diversity action plan and our new strategic plan.

I'm incredibly proud to be a part of the College of Science. Every day, I'm inspired by the remarkable, outward-looking people in our College who continually work for the greater good in their research, teaching and service.

After a year of community-wide engagement, I am delighted to

share that we officially launched the **College of Science Strategic Plan 2022-2027: Extending the Impact and Reach of Science** in October. View the plan at science.oregonstate.edu/sp22.

This new plan will guide the College of Science over the next five years in our aims to lead in inclusive scientific research, education and engagement in Oregon and globally. It is a community plan that reflects the priorities and values of our College of Science community – undergraduate and graduate students, faculty, staff and alumni – and strategic partners, board members and alumni who deliberated over the 2021-22 academic year.

Importantly, the plan is integrated with our diversity action plan, “Embedding Equity, Access and Inclusion.” We set out to create a plan that extends the reach and

impact of science knowing this can only be achieved by incorporating our core values around equity, access and inclusion.

In other important news, the OSU Foundation launched **Believe It: The Campaign for Oregon State University** in the fall. One priority for this fundraising and engagement campaign is the Collaborative Innovation Complex (CIC), and we are already halfway to the campaign goal of \$200 million. Learn more at OSUBelieveIt.org.

The CIC, which ties directly into our new strategic plan, will harness one of the nation's most powerful supercomputers and team-based research in artificial intelligence, materials science and robotics to solve global challenges in areas such as climate science, oceanography, sustainability and water resources.

The College of Science has been heavily involved in the CIC, and this research and education center will be key in helping us realize our aims to be “an inclusive global leader in conducting research, creating knowledge and fostering innovations that address critical societal challenges.”

I am so thankful to work with fellow scientists as together we advance solutions that the world needs now – like addressing climate change through transdisciplinary research (p. 6). And I'm excited to work with passionate College of Science colleagues and friends this year to extend the reach and impact of science.

Vrushali Bokil
Interim Dean, College of Science



We wish to 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).



First of its kind center for protein engineering opens

The College of Science is now home to the world's first NIH-funded genetic code expansion research center, called **GCE4All**. The new center solidifies Oregon State University as the global leader in harnessing this powerful tool for protein engineering. Ryan Mehl, professor of biochemistry and biophysics, is the center's director. Mehl and OSU have gained a reputation over the last decade as a world leader in improving GCE technologies.

Passion and Purpose

FACULTY AND STUDENTS

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.

New endowed position honors mentor

Malgorzata (Malgo) Peszynska has been named the inaugural Joel Davis Endowed Faculty Scholar. The award was created by alumnus Jerry Jacoby ('62, '66, M.S. '68) in honor of his late professor and mentor Professor Joel Davis, who worked for the College for 31 years.

A gigapixel camera to understand the universe

Physicist **Heidi Schellman** received \$3M from the Department of Energy to lead the computing effort of a project called the Deep Underground Neutrino Experiment, or DUNE, which aims to understand the secrets of how the universe exists. They will use liquid argon detectors to gather massive amounts of information on neutrinos. It's "like having a GigaPixel camera for neutrinos," said Schellman. "Of course, then you need to deal with Gigapixel size images, which is what the project is about." The resulting data will be processed and shared with more than one thousand scientists worldwide.

Paving the way for others in STEM

Marilyn Mackiewicz, assistant professor of chemistry, received

the coveted NSF CAREER Award, which supports junior faculty as scientific leaders who integrate education and research in their fields. Mackiewicz's project explores the use of reflective nanomaterials to help address age-related macular degeneration. She has also developed two courses in the chemistry department focused on helping the underrepresented minority students succeed in STEM. Mackiewicz received the College of Science's first Inclusive Excellence Award for her endeavors and will deliver the Inclusive Excellence Lecture in January 2023.

Virginia, the coral explorer

Congratulations to **Virginia Weis**, University Distinguished Professor of Integrative Biology, for receiving the Eminence in Research Award from the International Coral Reef Society, the most prestigious award in this discipline. For more

than 20 years, Weis has focused on the symbiotic relationship between corals and the algae they harbor within their cells – as well as what happens when the relationship breaks down due to changes in ocean temperatures, causing the phenomenon known as coral bleaching.

This undergraduate is “krilling it”

Biochemistry and molecular biology and environmental studies double major **Giulia Wood** had the ultimate hands-on learning experience: She spent six months at Antarctica’s Palmer Station studying krill as part of an all-women research team led by Associate Professor Kim Bernard. “Our goal is to determine how different diets will affect the physiology of juvenile krill to help us understand how krill will react to changes in the Western Antarctic Peninsula.”

Goldwater awardee aspires to work ‘from the bench to the bedside’

Honors biochemistry and molecular biology student **Gretchen Fujimura** was one of two OSU students to be awarded the 2022 Barry Goldwater Scholarship, the nation’s most prestigious research award for

undergraduates in STEM. Fujimura’s goal is to become a doctor-scientist working “from the bench to the bedside,” finding research questions with patients and bringing them back to the lab.

Grad students and alumni snag top NSF fellowships

Two first-year Ph.D. students have been selected for the NSF’s prestigious Graduate Research Fellowship Program. **Elena Conser** in integrative biology and **Andrew Clifford** in chemistry, are among five OSU students to receive the award this year. Conser, working with advisor Su Sponaugle, is studying the effects of hypoxia on larval and juvenile flatfish. Clifford works with Wei Kong to explore the structure of proteins.

Two alumni, **Tamara Jane Layden** (Zoology ’17) and **Rachel Sousa** (Mathematics ’20), also received the award.

Not your average pre-med

2022 Honors graduate **Saki Nakai** double majored in mathematics and psychology and spent her last two terms studying abroad in France to complete her French minor. She is also the only College of Science student to receive the

2022 Fulbright Student Award, which will support her for one year of independent study in cultural psychology at the University of Luxembourg. Nakai completed a SURE summer research project under mentor Vrushali Bokil, modeling bipolar disorder using ordinary differential equations and dynamical systems theory. “Sticking with the math major gave me a more enriching college experience,” she said.

Taking salmonids abstract

Microbiologist **Jerri Bartholomew** epitomizes what it means to be a scientist-artist. For the last 25 years, she has created glass art inspired by her research on parasites that live in salmonids. Her latest exhibit on campus, entitled “Abstracted: Where science meets art and music,” contrasted the scientific abstract with the artistic concept of abstraction.



Giulia Wood



Elena Conser



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

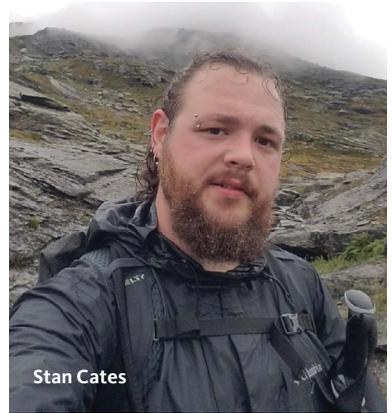
Jerri Bartholomew

Pop Art Parasite, pâte de verre casting, by Jerri Bartholomew

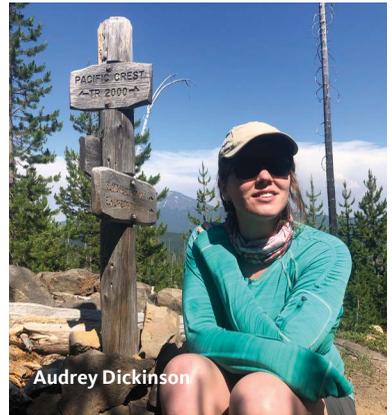
Photo by David Paul Bayles



Jeremy Chu



Stan Cates



Audrey Dickinson

Thinkers and Doers

ALUMNI AND FRIENDS

Fulbright and advocate for non-traditional students

Stan Cates (Zoology '20) is a recipient of the 2022 Fulbright Student Award, which will take him to the University of Tromsø in northern Norway for one year to study how behavioral monitoring can help conserve the critically endangered Arctic fox. He came to OSU after working for six years as a mechanic. While at OSU, Cates worked full-time while taking a full course load and assisting in a research lab. "You really have to fall back on your drivers" to get through, he said. "One of my drivers was, I wanted to be one of the first people in my family to have a college degree." Since graduating,

Cates has become an advocate for other non-traditional students, identifying how the college and OSU can better support other students like him and offering himself as a resource to other non-traditional students going through similar struggles.

Curing cancer with mathematics

Rachel Sousa (Biology '20), a second-year Ph.D. student at the University of California Irvine, took third place at UC's 2022 GradSlam contest for her research presentation "Curing cancer with math."

Grad Slam is an annual contest across all UC schools in which

participants are judged on how well they communicate their research for a general audience in three minutes or less. Her Ph.D. research focuses on using math to explore the interaction between the immune system and cancer.

While at OSU, Rachel focused on mathematical biology and interned one summer at the National Cancer Institute at the University of Utah where she used mathematical modeling of cancer cells plasticity to understand drug resistance and cancer immune cell therapies. "It was through that internship that I gained a deep interest in using math to study disease and where I decided that I wanted to go to grad school!"

Sousa also received the NSF Graduate Research Fellowship this year, a prestigious program which recognizes outstanding graduate students in STEM.

Data analytics provides the tools for success

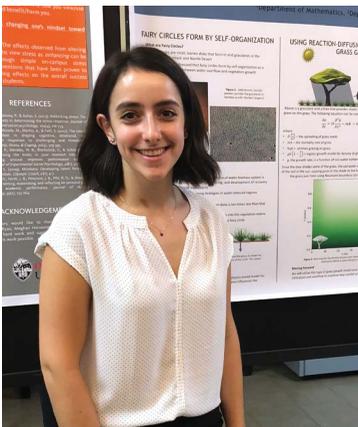
Audrey Dickinson (Data Analytics, '21) used the online data analytics program to help her trade in her engineering role at HP for that of a Supplies Business Driver and Forecast Analyst at HP in DC. "Right away, I applied things that I was learning to my job," she said. Reflecting on her student experience, Dickinson said, "OSU has all the tools and the people to help students be successful."

Fulbright Scholar to reengage his heritage

Jeremy Chu (Biology, '18) was an alternate for the prestigious Fulbright when he first applied in 2019. But for Chu, the second time was the charm. He is now in Taiwan as a Fulbright English Teaching Assistant. "I wanted an experience where I could re-engage with my Chinese heritage, learn Chinese and get immersed in an experience abroad for a year," he said. Chu's goal is to become a family doctor working in a community or school-based clinic.

Meet our newest alumni!

In case you missed it, check out our newest alumni on our Class of 2022 graduation page: beav.es/55t



Rachel Sousa



Making a difference for LGBTQ+ students

Alumna and longtime supporter **Judy Faucett** (Mathematics '70) has established the first scholarship in the College of Science specifically for LGBTQ+ students experiencing homelessness or other extreme circumstances.

Homelessness has long been an issue that Faucett cares about. When working in New York City earlier in her career, "you couldn't walk three blocks without encountering homelessness," she said. When she moved back to Oregon, she realized the problem was everywhere, yet "it was something I've been aware of, but something I thought was too big of an issue to have much of an impact on."

When she recently asked how Oregon State supports students experiencing homelessness, she learned a startling statistic: Though LGBTQ+ students make up roughly 10 percent of the student population, it's estimated that they account for 25 to 50 percent of the homeless student population. When she heard this statistic, Faucett was moved to action.

Named after the polymath artist, inventor and renaissance thinker Leonardo da Vinci, the Leonardo Fund provides emergency aid to LGBTQ+ students in the College of Science who experience sudden, extreme circumstances or life events. "It's for kids who are a little bit different because Leonardo was

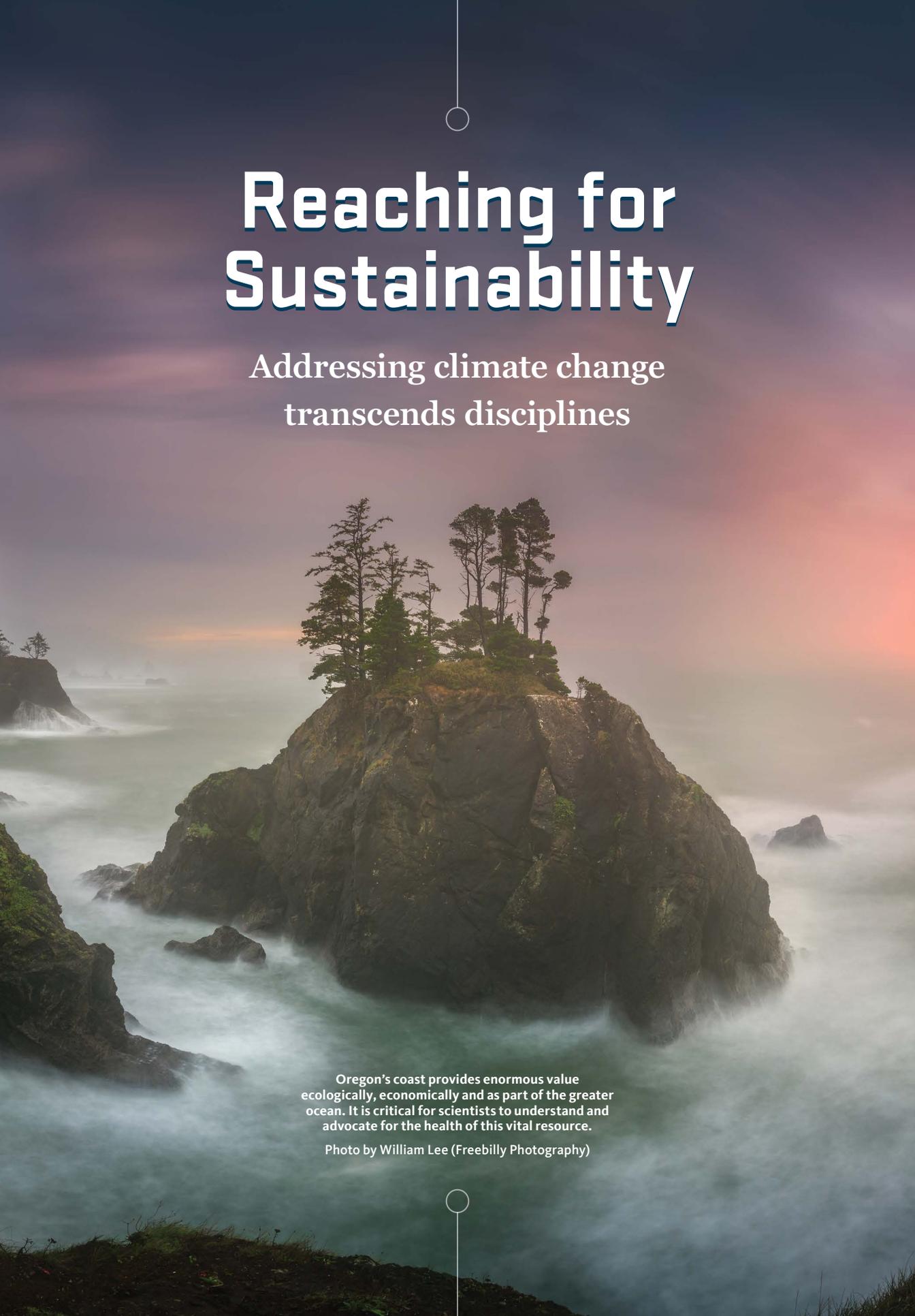
really different and very special," said Faucett.

One of the things Faucett does whenever she comes on campus is meet with students. Right when the idea of the Leonardo Fund was forming, she happened to meet with a small group of College of Science students who participated in the SURE Science program – another fund Faucett supports. At the end of the discussion, Faucett asked, What has been the best thing about being at OSU? One trans student replied, "What's been so great about Oregon State is I'm finally able to be me."

"What a great, great story about how far the university has come. It's just such a warm and welcoming environment," said Faucett. "He'd only known me for 45 minutes, but this is a safe environment and the students know it. I applaud that, and I'm happy to support it."

Faucett hopes others will be inspired by this fund and support it as well or create similar scholarships to support students experiencing homelessness, members of the LGBTQ+ community or any other minority group that is in need outside the College of Science.

"I want people to know that there is a need and they can make a difference," she said.



Reaching for Sustainability

Addressing climate change
transcends disciplines

Oregon's coast provides enormous value ecologically, economically and as part of the greater ocean. It is critical for scientists to understand and advocate for the health of this vital resource.

Photo by William Lee (Freebilly Photography)

In the face of a rapidly changing planet, faculty and students across every department in the College of Science are working together to better understand how our world is changing and find sustainable ways for nature and people to adapt. They understand that solutions require cooperative action across all disciplines — whether that is through harnessing new materials, interpreting complex data or reimagining how organisms can survive a warming planet.

Understanding our blue carbon sink

Oregon State University has long been a leader in marine science. Our faculty are frequently called upon for their expertise in fisheries management, coral reef bleaching, ocean acidification and coastal ecosystem preservation. They exemplify the College's dedication to leadership on the world stage — with Distinguished Professor of Integrative Biology **Jane Lubchenco** currently serving as Deputy Director for Climate and the Environment for the Biden Administration, and Associate Professor **Francis Chan** serving as the director of the

Cooperative Institute for Marine Ecosystem and Resources Studies, a National Oceanic and Atmospheric Administration center focused on collaborative study of the rapidly changing ocean and expanded demands on its use.

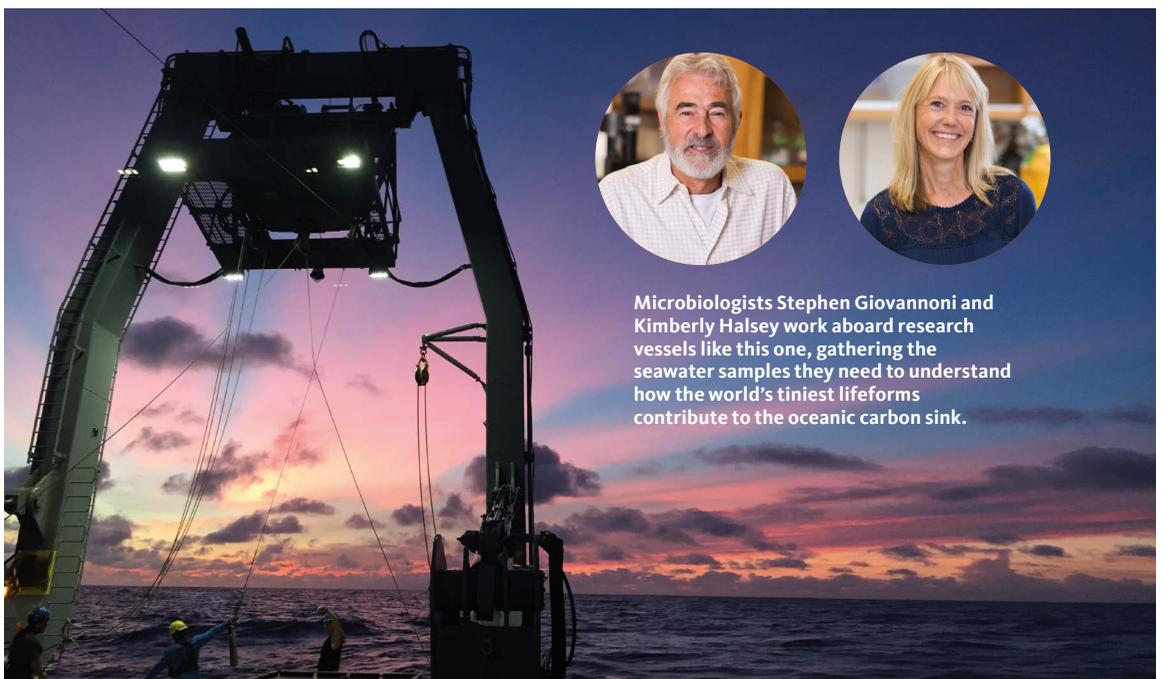
“Climate change is threatening to destabilize ecological communities,” said **Bruce Menge**, Distinguished Professor of Integrative Biology. Menge has been conducting research along the Oregon Coast for four decades and is concerned about where the future is headed. His research, published in the Proceedings of the National Academy of Sciences in January 2022, showed that ecological communities in Oregon's rocky intertidal zone have grown less stable for at least a decade. Though troubling, these findings provide critical information for how we might mitigate these problems.

The ocean has long been regarded as one of the earth's most important natural carbon sinks, storing around 80% of the planet's carbon in aquatic microorganisms called phytoplankton. Yet scientists still do not fully understand how

much carbon is sequestered in the ocean or what might affect this process. College of Science faculty have been exploring this phenomenon for decades to fill in the gaps in our understanding.

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.

Last winter, research led by microbiologist **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. “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,” she said.



Microbiologists Stephen Giovannoni and Kimberly Halsey work aboard research vessels like this one, gathering the seawater samples they need to understand how the world's tiniest lifeforms contribute to the oceanic carbon sink.



Using an LED reactor, members of the Stylianou Lab test the photocatalytic activity of porous materials. These materials have exciting potential for energy, environmental and sensing applications.

New materials to capture carbon and reduce waste

With so much at stake, developing technology to reduce the carbon dioxide (CO₂) levels in the atmosphere is crucial. This is particularly important at a time when projections for climate change due to CO₂ and other greenhouse gases are increasingly alarming. According to an October 2019 report from NASA, CO₂ in the atmosphere has increased 48% since the beginning of the industrial age, with one quarter of the increase taking place in the past 20 years.

In 2019, chemist **Kyriakos Stylianou** discovered a way to scrub carbon directly from factory smokestacks using metal organic frameworks with the ability to intercept CO₂ molecules from flue gas. Lab tests showed that the MOFs performed better than CO₂ removal materials currently available on the market at a much lower price point.

In January, Stylianou discovered something even better: the CO₂

harvested from smokestacks can be used to create a commercially valuable product. Loading an MOF with the common industrial chemical propylene oxide can catalyze the production of cyclic carbonates – a class of compounds useful in products such as battery electrolytes and pharmaceutical precursors.

Physicist **Matt Graham** is investigating how to capture not CO₂, but heat. Any time an engine runs or a motor turns, heat is produced – and wasted. Industrial waste heat is one of the leading contributors to global warming – and also one of the least discussed. Estimates suggest that about 70% of all the energy produced by humanity is lost as waste heat. To address this problem, Graham has begun a new project to develop a prototype of an ultralow bandgap semiconductor device to convert residual waste heat to energy.

For OSU researchers, this work isn't about the money – it's personal.

"I don't want to make materials just for my lab," said Stylianou. "I would like to make materials that can have some impact."

Data to inform decision-making

Mathematics and statistics are two of the quickest-growing fields in the country, and it's not hard to guess why. As technology advances, mathematical modeling or statistical analysis can provide faster, more reliable ways to examine lots of data. In practice, these skills provide critical insight to collaborative projects or to inform policymakers on the most environmentally sound decisions.

For **Brent Wolf**, a wildlife research biologist with the Oregon Department of Fish and Wildlife (ODFW), the College's two-year online graduate program in data analytics seemed like a way to make a bigger impact in the field he loved. "Going for the M.S. in data analytics has opened some doors for me that were previously closed,"

he said. “I really like being able to provide wildlife managers with study results that can help them make the best decisions possible.”

Helping people make better environmental decisions motivates many College of Science faculty as well. Climate change and unsustainable land use have degraded millions of acres of land around the world. These disturbances are detrimental to native plants and often create opportunities for invasive species to take over.

In 2019, statistician **Virginia Lesser** was recruited as a committee member for an assessment entitled “The Need for Native Seeds and the Capacity for their Supply, sponsored by the National Academies of Sciences, Engineering and Medicine. Native seeds play an essential role in maintaining and restoring natural areas. The committee explored the complex systems of native seed production and use in the United States, and examined their

viability for future projects, with a final report expected in 2022.

As fires become more prevalent throughout the west, landscapes are changing in ways that could make them less resilient to fire in the future. Mathematician **Enrique Thomann** participated in a study published in the Journal of Ecology that examined how changing ecological composition impacts the landscape’s ability to resist fire damage in the future — an area that continues to be under-researched.

Fire modifies vegetation composition and structure, which may then shape the spread and severity of subsequent fires. Given the many interacting variables that influence how ecosystems respond to disturbance, models calibrated to a specific study area are highly valuable in evaluating how that ecosystem responds to alterations of its disturbance regime.

By better understanding marine ecosystems and the carbon

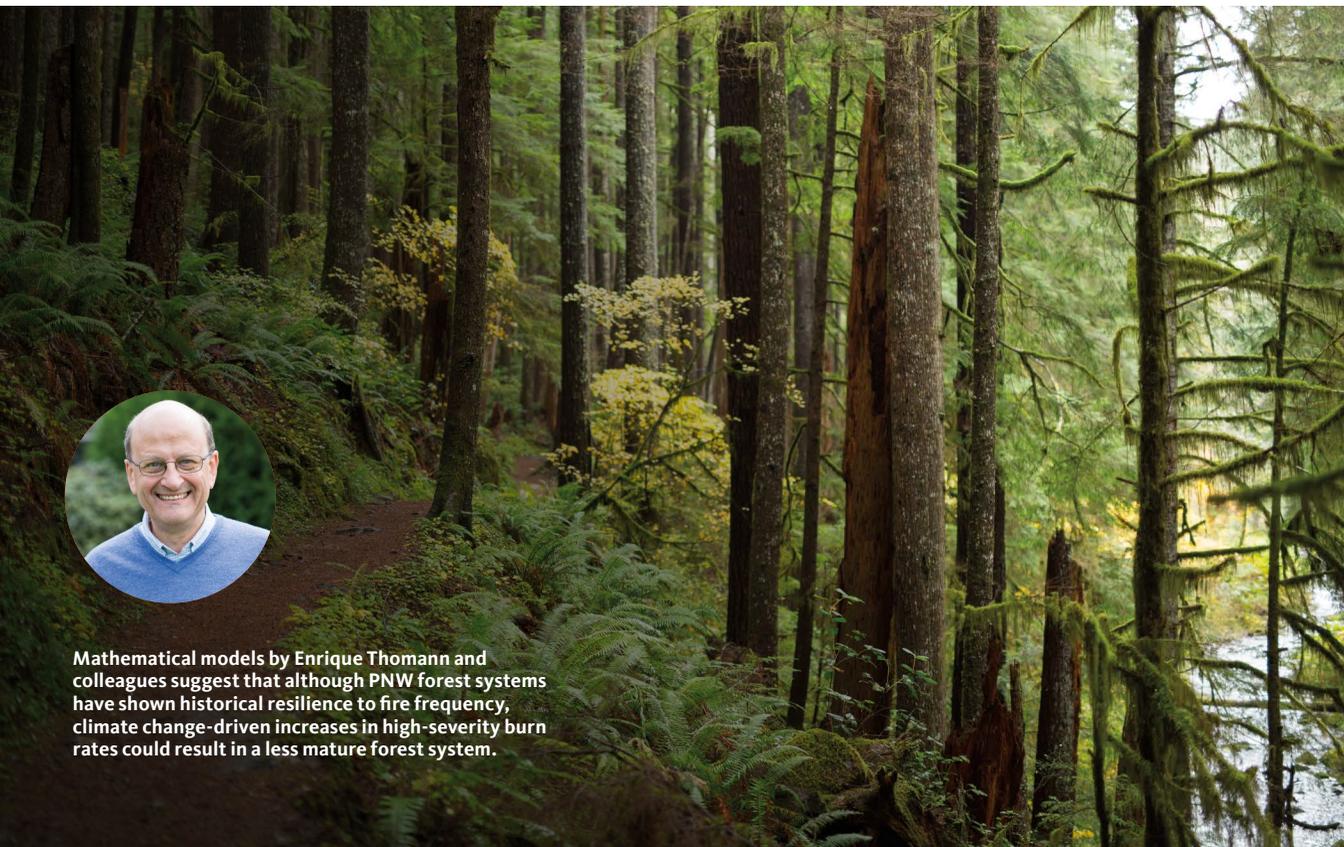
cycle, developing new materials to absorb carbon and make industry more climate-friendly, and providing data to make better decisions, College of Science faculty and students are doing their part to help support a more sustainable future for our planet.

Integrative biology Ph.D. student **Kristofer Bauer** witnessed the value of research first-hand as an undergraduate biology student at Oregon State while working with Menge and Assistant Professor **Felipe Barreto** on a project studying sea stars along the Oregon Coast. “I saw the impact that our research was having on understanding the effects of climate change on marine ecosystems and fisheries in Oregon. I saw that as something bigger than myself that I wanted to be a part of.”

To read more about climate-related research in the College of Science, visit beav.es/isP



Mathematical models by Enrique Thomann and colleagues suggest that although PNW forest systems have shown historical resilience to fire frequency, climate change-driven increases in high-severity burn rates could result in a less mature forest system.





Discover

RESEARCH



David Hendrix



Jenna Sullivan-Stack



Kirsten Grorud-Colvert



Bo Sun



Adrian Gombart

Unraveling “the essence of *Cannabaceae*”

After being the first to successfully sequence the hop genome in 2021, **David Hendrix**, associate professor of biochemistry and biophysics, received a three-year \$638K award from the U.S. Department of Agriculture National Institute of Food and Agriculture to create a database that further explores the distinct adaptations responsible for the variability in aromas, flavors and production of *Cannabaceae*. Currently, developing new strains of hops and hemp is an expensive

and time-consuming process. This study could help eliminate many of those obstacles. “We will help breeders develop new varieties of hop and hemp that will meet the needs of emerging markets with an increasingly sophisticated palette for exotic flavors and aromas,” said Hendrix.

More MPAs, now

A study published in *Frontiers in Marine Science* examined the nation’s 50 largest marine protected areas, or MPAs, and found that the U.S. needs to create more, and

more effective MPAs, and fast. More than 98% of U.S. waters outside the Central Pacific Ocean are not part of an MPA, and the ones that are part of an MPA are only lightly or minimally protected from damaging human activity.

“These findings highlight an urgent need to improve the quality, quantity and representativeness of MPA protection to bring benefits to human and marine communities,” said **Jenna Sullivan-Stack**, integrative biology research associate and lead author.

“This information on protected area quality is crucial, as policymakers try to measure and improve the level of protection offered by existing MPAs and work to develop new ones,” said co-author **Kirsten Grorud-Colvert**.

Slowing neurodegenerative diseases

Biochemist **Maria Franco**, along with collaborators **Carrie Marean-Reardon**, **Ryan Mehl** and **Alvaro Estevez**, discovered a new class of potential drug targets for people suffering from neurodegenerative conditions such as Alzheimer’s, Parkinson’s and Lou Gehrig’s disease. The possible targets are oxidized proteins, and researchers are now in pursuit of the best way to attack them. By targeting just these oxidized proteins that lead to a breakdown in healthy cellular processes, normal healthy cells will remain unaffected. “That means such drugs should have minimal to no side effects,” said Franco.

Food for thought

In October, **Ryan Mueller**, associate professor of microbiology, led a study to track which microbes are consuming different types of organic carbon produced by common phytoplankton species. Published in the Proceedings of the National Academy of Sciences, the study found that they exhibited distinct but predictable preferences in their food sources – which

are likely to change as ocean temperatures rise. The research is an important step toward forecasting how much carbon will leave the ocean as a greenhouse gas, and how much will end up entombed in marine sediments.

Vitamin D to the rescue

Biochemist **Adrian Gombart** and researchers from the University of Nebraska Medical Center have discovered that adding an enzyme inhibitor to wound dressings loaded with vitamin D resulted in fewer post-surgical infections. Each year in the U.S. alone, roughly 300K surgical patients develop an infection within 30 days of their operation, and more than 13,000 of those people die. The infections account for an estimated \$10 billion in additional health care costs.

“Because these wound dressings work by enhancing innate immune responses rather than by containing conventional, single-target antimicrobial compounds, they are less likely to contribute to drug resistance,” said Gombart.

Tracking how cancer invades

A discovery from physicist **Bo Sun** has shed new light on the way malignant cells change their shape and migrate to invade different types of tissue. The findings, published in the journal *Scientific Reports*, are a key step toward

understanding and preventing cancer metastasis.

“Through billions of years of evolution, cells have learned a number of distinct ways to migrate,” said Sun. “In the case of a tumor, however, those migration programs are leveraged by cancer cells to sustain their invasion into tissue.”

Research grants to seed the next great idea

Between 2019 and 2022, the Science Research and Innovation Seed (SciRIS) program in the College of Science has provided \$851K in seed funding, creating an engine of innovation for our scientists to delve into fundamental research discoveries and translate them into revolutionary applications.

In this and our following issue of IMPACT we celebrate some of our SciRIS award recipients.

TEAMWORK MAKES THE DREAM WORK

These interdisciplinary projects from academic year 2021-22 are exploring new areas of research, helping the College to extend the impact and reach of science.

Capitalizing on OSU’s concentration of expertise and resources for studying dynamic protein complexes across scales, **Elisar Barbar**, **Afua Nyarko** and **Maria Franco** from the biochemistry and biophysics



What happens when a disease becomes endemic?

Anna Jolles, an epidemiologist with dual appointments in the College of Science and the Carlson College of Veterinary Medicine, led a study revealing new insights on the persistence of disease in African buffalo populations. The study, published in *Science* magazine, looked at the transmission mechanisms of three main strains of foot-and-mouth

disease among buffalo herds and its implications for human diseases like COVID-19. “While buffalo herds can be geographically contained, the global human population is more interconnected than ever before,” Jolles said, “so it’s easier for pathogens to become endemic and persist long-term.” *Left: Anna Jolles measures growth in an African Buffalo calf.*



Wei Kong



Lan Xue



Swati Patel



Yanming Di

department teamed up with **Michael Blouin** from integrative biology to establish new technologies to investigate cancer-related complexes and host-parasite interactions.

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 Fryer Aquatic Animal Health Lab. The model will allow College of Science researchers across biology, chemistry and ecology to perform highly controlled, repeatable experiments on reef ecosystems, which are under increasing threats from climate change, pollution, habitat destruction and disease. By bringing the reef to researchers, carbon emissions associated with their frequent travel are also reduced. The facility will 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 mitigate and reverse reef decline.

Chemist **Wei Kong** and statistician **Lan Xue** teamed up on a project to develop more effective mass spectrometry through inclusion of electron diffraction. With this addition, future mass spectrometers will be able to reveal not only the mass composition of an unknown species, but also the three-dimensional arrangement of the constituent atoms. This capability can change the paradigm of nanomaterial synthesis, allowing intelligent design and quality control of custom-made materials applicable in medical diagnostics and therapeutics, in energy harvesting and storage, and in catalysis.

USING MATHEMATICS TO CURE A TROPICAL PARASITE

As part of the SciRIS program, the Disease Mechanism and Prevention Fund (DMPF) supports research into the mechanism, diagnosis, treatment and prevention of human disease. These funds are provided by a generous gift from David and Donna Gould.

Mathematician **Swati Patel's** research addresses soil-transmitted helminths (STH) – parasitic worms that infect an estimated

1.5 billion people, primarily in developing tropical countries. Periodic deworming is essential for treatment and prevention, but STH are developing resistance to the drugs used. With her DMPF award, she hopes to use systematic mathematical modeling to discover the mechanisms that cause resistance and find a way to prevent it.

NEW TECH FOR SEED TESTING

In partnership with the OSU Seed Lab, the official seed testing laboratory for the State of Oregon, Associate Professor **Yanming Di** uses statistical methods to improve seed sampling devices. Essential to the agricultural marketing system for determining seed quality and value, most of the current practices are holdovers from the 1970s. His SciRIS individual investigator award aims to start a new wave of groundbreaking innovations by incorporating recent advances in robotics, computer vision, machine learning and stochastic modeling into seed testing.

To read about more of the SciRIS individual awards, visit beav.es/inC



SciRIS Stage 1 team awardees Jerri Bartholomew, Virginia Weis, Rebecca Vega Thurber, Denise Silva and Ruth Milston-Clements will develop a model tropic reef facility at Oregon State



College News



Steps toward a more equitable college

In 2022, the College of Science took another step toward a more equitable future with the hire of **Kameron Kadooka** as our first permanent director of equity, access and inclusion to help us implement our Diversity Action Plan, or DAP, which launched in fall 2021. “I am excited to make lasting and impactful change to the way everyone experiences the College of Science,” he said.

One of the goals in the DAP is to “broaden the image of a scientist.” On International Women’s Day, the College of Science hosted a talk by Laura Greene, chief scientist at the National High Magnetic Field Laboratory and physics professor at Florida State University. The event also featured a panel discussion on negotiation skills featuring notable College of Science female faculty members, including ecologist **Sally Hacker**, chemist **Marilyn Mackiewicz**, biochemist **Afua Nyarko**, microbiologist **Rebecca Vega-Thurber** and moderated by mathematician **Vrushali Bokil**.

A fond farewell

After five years leading the College of Science, **Roy Haggerty** stepped down as dean in July 2022 to become executive vice president and provost at Louisiana State University. An exceptional leader and scholar, Haggerty co-founded multiple programs to improve the retention and support for first-generation and underrepresented students, including Beaver Connect and Undergraduate Student Success Initiative. He also was an early advocate for decisive action through TRACE, which tested 80,000 people for COVID-19 at OSU and across Oregon.

Extending the Reach and Impact of Science

Our new Strategic Plan 2022-2027: Extending the Impact and Reach of Science launched in October. This new plan will guide the College of Science over the next five years in our aims to lead in inclusive scientific research, education and engagement in Oregon and globally. The plan is integrated with our diversity action plan, “Embedding Equity, Access and Inclusion.” Learn more at science.oregonstate.edu/sp22.

Fostering excellence

Six College of Science faculty, staff and graduate students and one teaching team received awards at University Day, Oregon State University’s prestigious annual awards in September. These awards recognize exceptional and innovative teaching, diversity advocacy, mentorship and more.

Vrushali Bokil, Outstanding Diversity Advocate Award

Jesse Laney, Excellence in Undergraduate Research Mentoring by a Graduate Student Award

Valeri Sawiccy, Herbert F. Frolander Graduate Teaching Assistant Award

Marita Barth, OSU Faculty Excellence in Online Teaching Award

Lindsay Biga, OSU Faculty Teaching Excellence Award

Christopher Beaudry, OSU Impact Award for Outstanding Scholarship

Principles of Biology Instructional Team, Student Learning and Success Teamwork Award

“I Believe
when we learn
together, we
learn the most.”



Devon Quick, Ph.D. '09
Whiteley Faculty Scholar, OSU College of Science

Oregon State University has the expertise to solve the world's most pressing problems, the track record to prove it and a community with compelling reasons to support the cause.

Visit OSUBelieveIt.org to learn more about **Believe It: The Campaign for Oregon State University**, which aims to inspire support for the next generation of OSU change makers.



Believe it.

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Oregon State University