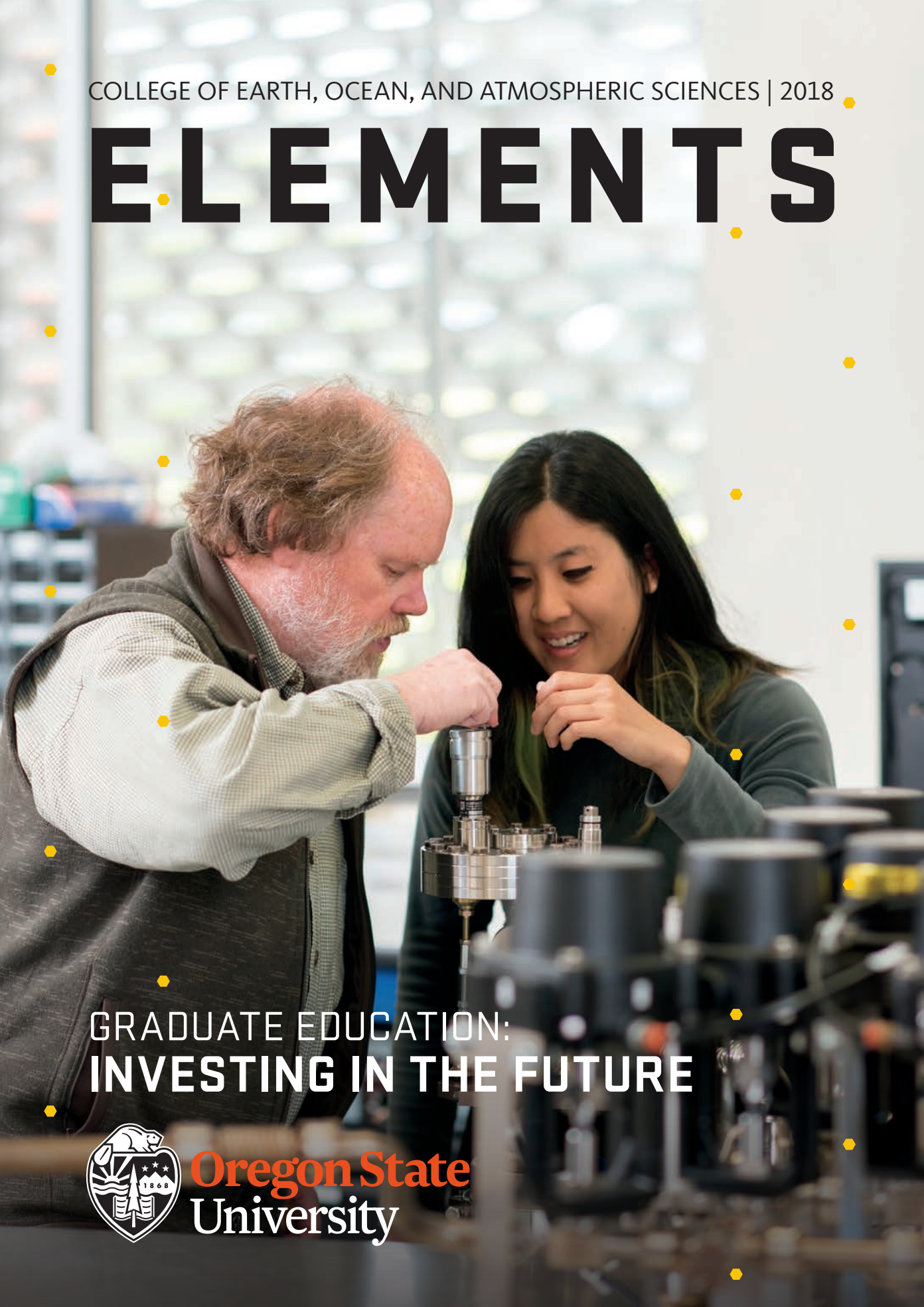
COLLEGE OF EARTH, OCEAN, AND ATMOSPHERIC SCIENCES | 2018

ELEMENTS



GRADUATE EDUCATION:
INVESTING IN THE FUTURE

Oregon State University

Editor
Abby P. Metzger
ametzger@coas.oregonstate.edu

Graphic Designers
Crystal Barnes and Teresa Hall

Contributing Writers
Abby P. Metzger and Nancy Steinberg

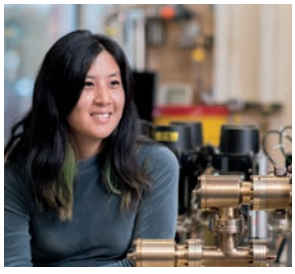
Copy Editors
Gary Dulude and Britt Hoskins

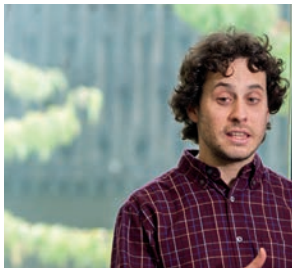
About the College
The College of Earth, Ocean, and Atmospheric Sciences (CEOAS) is an internationally recognized leader in the study of the Earth as an integrated system. With more than 100 faculty, 200 graduate students and 600 undergraduate students, the college has an annual budget of more than $50 million. Most of the college's research support comes from the National Science Foundation, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration and other federal agencies and philanthropic organizations.

Contacts
College of Earth, Ocean, and Atmospheric Sciences
Oregon State University
104 CEOAS Admin Building
Corvallis, OR 97331-5503
541-737-3504
ceoas.oregonstate.edu

Roberta Marinelli, Dean	541-737-5195
Eric Kirby, Associate Dean for Academic Programs	541-737-5169
Tuba Ozkan-Haller, Associate Dean for Research and Faculty Advancement	541-737-9170
Philip Mote, Associate Dean for Strategic Initiatives	541-737-5694
Student Services	541-737-1201
Doug Brusa, Director of Development	541-207-8686

ON THE COVER: Geology and geophysics Professor David Graham and Ph.D. student Thi Truong are using geochemistry techniques to understand the genesis and growth of the Hawaiian islands. Photo by Hannah O'Leary.





An investment in graduate students is an investment in the planet and ourselves.

$50,000 — that's the approximate cost to fund one graduate student for one year in the College of Earth, Ocean, and Atmospheric Sciences and at most universities.

It is a modest investment in our future.

Graduate students are tomorrow's leaders, destined to be at the helm of agencies, new businesses and the academic enterprise. Supervised by stellar faculty, they are the engines of scientific progress, carrying out experiments and working tirelessly in the laboratory and field to make new discoveries. They shape the research landscape and tackle humanity's most daunting challenges: food, water and environmental security; ocean health; prediction of and response to natural disasters and more. They mentor undergraduates and connect them to faculty, creating a rich and stimulating environment that builds our reputation and legacy.

Investing in graduate education means investing in our nation's competitiveness. In a report on graduate education by the National Science Foundation, the authors mince no words — for the United States to maintain its position as a global leader, it must remain at the forefront of STEM (science, technology, engineering and math) education and innovation. Yet, Europe already produces more doctorates in science and engineering than the U.S. Additionally, China and India are making substantial investments in their graduate programs.

Will we fall behind? We might. Authors of a recent eLife Sciences article warn that historic lows in funding for academic research in the U.S. threaten to create a "lost generation" of researchers — bright scientists who leave the profession in pursuit of more stable employment. Those who stay may take fewer risks and innovate less, thus hampering scientific discovery. Born out of this growing threat is an opportunity for Oregon State's College of Earth, Ocean, and Atmospheric Sciences to take a leadership role to nurture a new generation of scientists.

Competition for the most promising graduate applicants is fierce, and we are most successful when we can offer full support, an increasingly difficult proposition with research funding on the wane. Full funding allows our students to graduate without debt and to enter the workforce with the skills, passion and vision to ensure environmental sustainability, protect our national infrastructure, create jobs, start enterprises, enhance the health and security of vulnerable populations and predict the next catastrophes.

In this issue of *Elements*, you will meet some of our outstanding graduate students in every stage of their program — from just starting at Oregon State to landing their first jobs. It is their stories that show why a robust graduate education program is vital for Oregon State's reputation — and for the nation.

Roberta Marinelli, Dean

You can help.

In order for CEOAS to rise to these challenges, it is critical that we invest in our collective future through private giving. The impact our graduate students make on society means there is no greater return on a philanthropic investment. Please consider joining us as we embark on raising vital support for our graduate students through the CEOAS Student Research Fellowship Fund.

To make a gift, go to osufoundation.org/CEOASStudentFellowship or for more information on supporting these outstanding students, contact Doug Brusa at doug.brusa@osufoundation.org or 541-207-8686.

New Associate Dean Eric Kirby likes to watch mountains grow and graduate students thrive.

Eric Kirby, the R.S. Yeats Professor of Earthquake Geology and Active Tectonics, has been appointed as the associate dean for academic programs. While he's still getting his sea legs — an interesting metaphor for a solid earth geologist — *Elements* asked him a few questions to introduce him to you.

Tell us a little bit about your background. How did you end up at Oregon State?

Before Oregon State, I taught on the geosciences faculty at Penn State University for just over 11 years. I was drawn to Oregon State by a combination of factors. The spectacular setting and proximity to the mountain landscapes that are central to both my research and personal interests were attractive, but the primary draw was the wonderfully broad range of researchers whose interests complement my own in tectonics and mountain building. There are few places that have the diversity of research strengths as CEOAS across the terrestrial, marine and atmospheric realms, and I feel fortunate to work in such a place.

What attracted you to the associate dean for academic programs position?

The adage, "may you live in interesting times," seems appropriate here. We face continuing pressure to succeed in a world of dwindling resources, yet many of the pressing questions we face as a society — climate change, natural disasters, resource sustainability — lie directly in our wheelhouse.

CEOAS remains exceptionally well-poised to address a wide range of basic science questions that cross the shoreline, assess the societal dimensions of many of those questions and train the next generation of leaders.

What does CEOAS do particularly well with respect to graduate education, and what new initiatives do you envision undertaking?

Our graduate students work closely with top researchers in their field, and they do so in what are, in many cases, state-of-the-art laboratories. It's hard to overstate the importance of mentoring and facilities in student success. One aspect that I would like to see us focus on is the training of students as cohorts, teams of individuals focused on separate but related aspects of a larger problem.

What is the trend in funding graduate student research right now? Why in your mind is it important to adequately fund graduate students?

Funding to support graduate students continues to be a challenge, as research grants become more competitive and as the cost of doing business rises. Moreover, the cycle of funding for a research project does not always align with an individual student's trajectory through the program, and so one of our challenges is to find ways to buffer students from these variations and allow them to focus entirely on their research.

You study a fascinating intersection of climate, erosion and tectonics. Can you give us the 30,000-foot view of your research?

The 30,000-foot perspective is particularly apropos. At that elevation, the highest summer temperatures on the planet are located over the Tibetan Plateau, a massive region of high topography north of the Himalayas in central Asia. In fact, the topography perturbs atmospheric circulation so that the loops in the jet stream that you see in most weather maps of the U.S. are largely a consequence of the Tibetan Plateau and the Rocky Mountains. Without these, New York would be, on average, a few degrees warmer than it is today, and Berlin would be a few degrees colder.

We can study such effects in the modern system, but understanding how these have changed over geologic time is much more difficult. So, a lot of my effort has been in trying to reconstruct when the high mountains in Asia developed, by what processes they rose and how erosion influenced their growth.

What do you do for fun, when you're not in the field or lab?

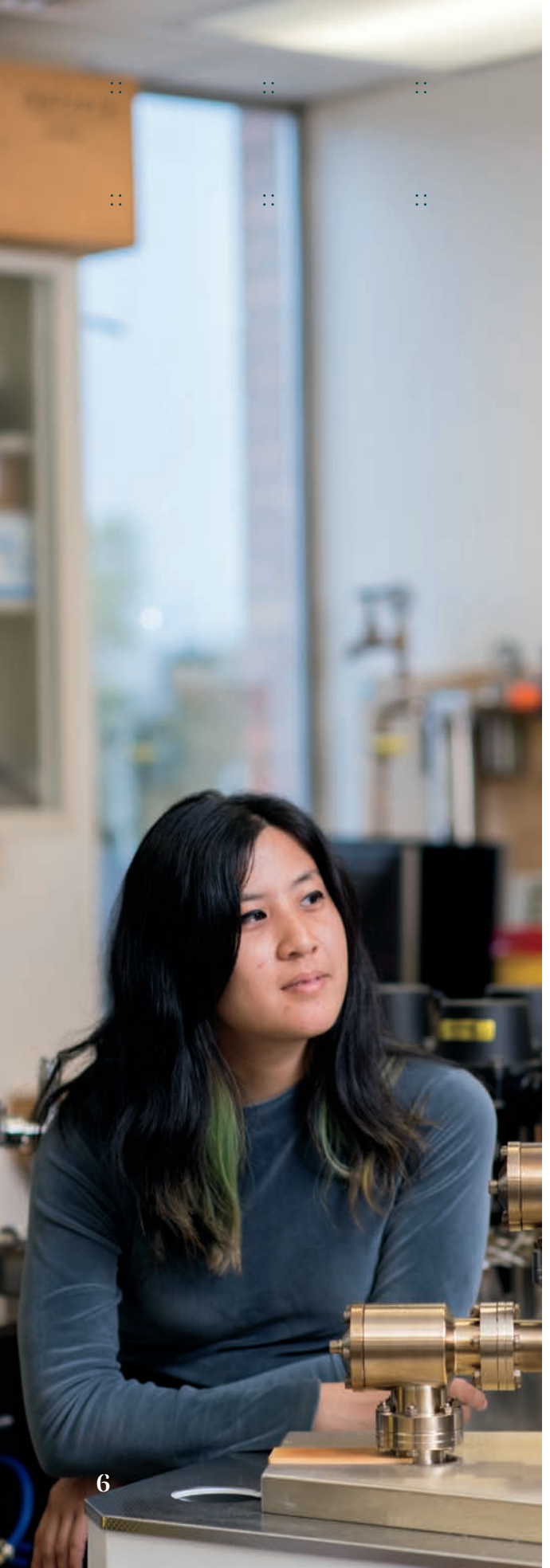
I am an avid telemark skier, and although my knees are not what they used to be, I try to get out as often as possible during the winters. Most recently, I've been enjoying teaching my two daughters the pleasures of sliding around on frozen water. And, at the moment, I'm reading a biography on Alexander von Humboldt, a scientist and explorer whose vision of interconnectedness among climate, life and landscapes first sketched some of the ways in which we see the world today. Fascinating.

Advice for incoming graduate students?

To students starting to think about pursuing graduate school, seek out a program where the current students are excited about their science. Your peers play nearly as important a role in your success as do your mentors. To students arriving at CEOAS this year, welcome. Don't be afraid to dive right in. Science is a prolonged conversation, one that plays out across the various media of momentary hallway meetings, professional conferences and publications. Like any good conversation, it requires both listening and speaking. So, take time to focus on your scholarship as well as your research.

Eric Kirby chases mountains.

How are mountains born? Eric Kirby is interested in finding out, especially with respect to the way in which climate, erosion and tectonics conspire to build and sculpt them. His research interests include the seismic behavior and evolution of active faults, the way in which landscapes record deformation of the Earth's surface and the influence of climate on landscape evolution. These projects have taken him to the far corners of the planet, from the Colorado Rockies to the high and remote Tibetan Plateau.



Studying how volcanoes form is a heavy lift for most. Not for Thi Truong.

At five-foot flat and just over 100 pounds, Thi Truong is an unlikely weightlifting buff. But the first-year geology Ph.D. student broke California state records in powerlifting in the bench press and squat, and twice broke the national record for the deadlift when she hoisted an astonishing 287 pounds off the ground — nearly three times her bodyweight.

Initially, Truong was the only lightweight female on the competition circuits she traveled.

“A lot of women are intimidated by learning the basics in a crowded weight room with limited equipment and several men who look more suited to the environment,” she says. “In the beginning, I had to ignore the fact that other people could judge my performance.”

Her philosophy in weightlifting has translated well to academic life, where Truong rarely sees another Asian or woman in geology courses.

“Just like with weightlifting, I learned there is no downside to being someone who doesn’t fit the mold. I can just follow what interests me,” she says.

Truong’s pragmatic outlook on adversity makes sense. A first-generation college student, her parents emigrated from Vietnam in the early 1980s, in the aftershock of the country’s fall to communism. Her father was a military man who fought on the side of the Americans.

“He claims that if he and my mother had stayed in Vietnam, I would not have been able to attend the university, since the government recorded the names of those who fought or provided intelligence to the South Vietnamese. My father’s association with the former enemy could have meant being blacklisted from a public university,” Truong says.

Her parents settled in San Diego, and Truong powered her way through many barriers — with a no-nonsense outlook. Her fierce determination helped her get into the University of California, San Diego, where she earned both an undergraduate and master's degree in geochemistry. As she moved from undergraduate to graduate work, she was frequently the only woman and the only person of color in field camps, lab work and lecture rooms. But Truong was unfazed.

She approached her petrology lecturer, Professor Pat Castillo, about working in his research group and began studying the origin of mantle plumes. Rock samples from the Juan Fernandez Islands off the coast of Chile allowed her to peer into a distant past using powerful mass spectrometers.

"I think that's one of the strengths of geology — we have a lot of access to different instruments that can be used to analyze data and explore a single theory," she muses.

Truong became equal parts scientist and historian, piecing together the ages of Earth from various sources to get a complete story. She also was fascinated with geology forerunners who broke barriers. Her bookshelf holds the biographies of pioneers like Harry Hess, a pillar in plate tectonics theory, and Alfred Wegner, the originator of the theory of continental drift — both scientists who were considered geology giants only in hindsight.

"It was reassuring to see how different people came to discover the discipline," she says.

At Oregon State University, Truong is continuing her explorations in geochemisty and geochronology with Professor David Graham. As a first-year graduate student, Truong is just getting started on her research into the volcanic flows of Kauai, one of the northernmost islands of the Hawaiian chain. The island, along with the entire Hawaiian chain, is thought to have originated from a plume of molten rock deep within the Earth's mantle. Kauai's older volcanic flows, which date as far back as five million years, offer an opportunity to study the original Hawaiian mantle source. Truong will analyze rock samples to get a more accurate estimate of the trace element compositions and relative ages of volcanic flows on the island. She emphasizes that properly dating the volcano will help researchers understand how and when it formed, as well as predict where the next volcano will appear as the trail continues to spread.

Truong is fortunate to have received an ARCS Foundation scholar award in support of her research. She envisions using the support to attend an international conference, which is an important avenue for developing collaborations.

"I feel a lot of possibility for international collaboration," she says. "It's good for a graduate student to have enough money to go to a conference."

For Truong, geology has provided a fascinating window into the deep past, the interior of the Earth and even the origins of life. In her words, "We can learn a lot about ourselves by knowing what we're standing on."

Likewise, Truong has learned a lot about herself by knowing just how much she can lift.

The grad-undergrad connection — students help students.

Graduate students pay it forward by working with undergrads in a number of ways, often serving as a bridge between them and faculty members. Thi Truong is giving back at the start of her graduate school journey by serving as a graduate teaching assistant for two undergraduate classes. Juan Muglia (p. 10) has mentored undergraduate summer interns in Andreas Schmittner's lab, while Alan Devenish (p. 8) has been a TA in multiple undergraduate GIS classes. "It's been gratifying to see several of those students go on to graduate certificate or graduate degree programs," Devenish says.

Alan Devenish studies the human reaction to a world stressed by drought.

Like the contoured lines of a topo map, Alan Devenish's path to studying remote sensing and GIScience (Geographical Information Science) at Oregon State meandered through the hills and valleys of his evolving interests. Growing up in California's gold rush country, he was a bookworm who occasionally ran into people while trying to read and walk at the same time.

An undergraduate degree in modern literature seemed like a natural next step and the beginnings of an exciting writing career. He worked as a proofreader at a large tech company in Silicon Valley, an experience he calls eye opening but "extremely boring." But, travel abroad gave Devenish a global perspective. After teaching English in Taiwan, he worked in China as a journalist for a mining magazine during the run-up to the 2008 Olympics, a time of massive modernization for the country. Devenish saw how landscapes could undergo rapid change, embodying stories of urbanization and environmental degradation.

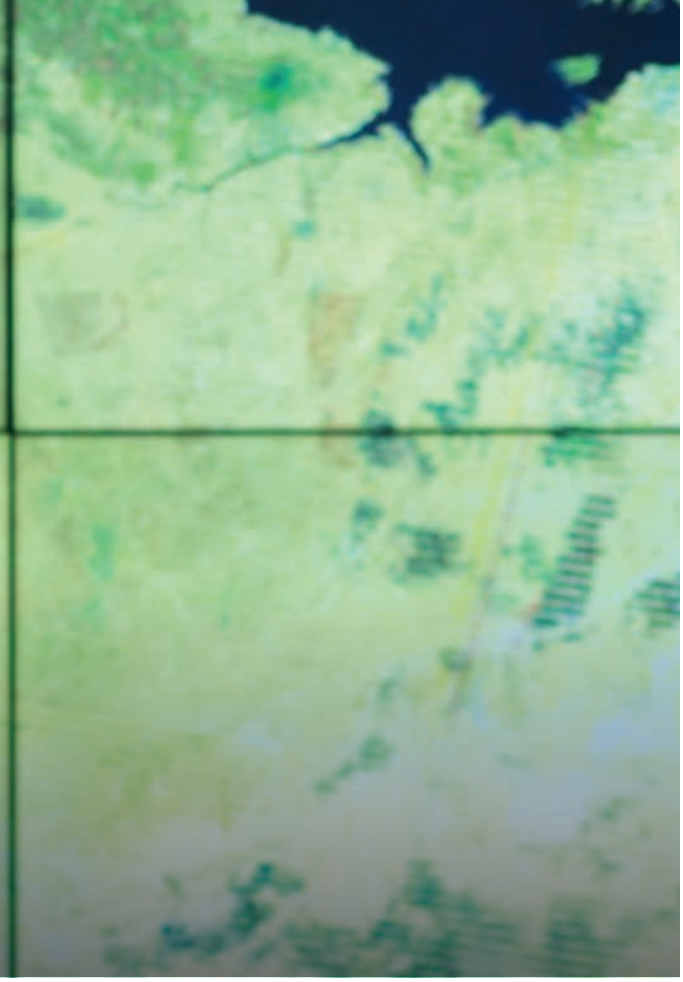
"This experience got me thinking about resource extraction, supply chains, global commodity markets and all these issues I didn't consider as a modern literature major," he says.

Devenish heard about remote sensing in relation to mining operations looking at the Earth from above to optimize site selection and extract metals. It sounded fascinating, but Devenish had no idea what it was.

"I thought remote sensing had something to do with ESP," he jokes.

As he learned more, he saw a parallel between writing and visual science — both could be used as storytelling vehicles. So, Devenish went back to school at Portland State, earning a GIScience certificate and a master's degree in geography. He used remote sensing to look at development policies in the south of France, specifically how agrarian communities became industrialized and faced population declines as the region tried to keep pace.

Alongside his new-found skill set in remote sensing, Devenish continued writing, including stories for *WIRED* magazine. By day, he was writing about technology in popular culture. By night, he was reading about natural resources. He began to wonder if he had his priorities reversed, so he took a temporary job in Nebraska doing mapping projects for the Game and Parks Commission to brush up on his GIScience skills.



With support from an Oregon Lottery Graduate Scholarship, Devenish will start to answer some of these questions. He has already shared his research at the American Water Resources Association conference and will present at the American Association of Geographers annual conference in April 2018.

Devenish will also work with Assistant Professor Robert Kennedy on a NASA-funded project to understand how much carbon is stored in U.S. forests. Satellite images will allow them to estimate the biomass of forests and their capacity to store carbon and potentially influence the outcomes of climate change.

"We already have a good model for the West Coast. Now we want to expand the model to the continental U.S.," he says.

Going forward, Devenish plans to make a straight shot into academia, with no meandering. His clear path forward stems from the urgency and importance he finds in his work.

"These are crucial issues to explore, because of the rate of environmental change that we're experiencing right now," he says. "And these are issues that will only become more acute and the consequences more obvious."

Now firmly ready to pursue his Ph.D. and study GIScience, Devenish chose Oregon State. For him, the school provided an excellent blend of human and ecological perspectives within the geography discipline.

"As I learned more about OSU's geography faculty, I realized that this was a department that would help me ask and answer the practical, social science questions I wanted to explore — that it wasn't just physical geography," he says.

Devenish is diving head first into a fascinating problem space where mapping, social forces, policy and resource extraction collide. Working with Assistant Professor Jamon Van Den Hoek, he will use satellite imagery to conduct a global assessment of how border regions surrounding reservoirs respond to drought. Because these regions may include multiple countries all using or affected by a single dam, his assessment will examine how sociopolitical forces influence water availability. A country, for example, could withhold water and negatively impact agriculture in a downstream country. How would that look on a map? How will that action impact vegetation, lakes and rivers? How will the landscape change over time? And how might drought affect political stability or even population migration?

Jamon Van Den Hoek keeps an eye on conflict.

Information about social conflicts was once gathered primarily through eyewitness accounts — placing citizens, reporters and other observers at great risk. Now, remote sensing technologies can capture valuable intelligence on conflicts to help inform national security, the international community and aid groups. Jamon Van Den Hoek, an assistant professor in geography, is at the forefront of using such approaches to monitor armed conflict. He specializes in the use of remote sensing and geospatial analysis to understand the relationship between military operations, for example, and the environmental changes that result.

For Juan Muglia, getting a Ph.D. meant joining the family business.

Juan Muglia's mother, a phytoplankton biologist, gave him a tremendous gift, one he did not recognize until much later.

When he was in sixth grade, his mother took a sabbatical from her Argentinian university and went to work for a year at the University of Rhode Island, where she had been a post-doctoral researcher before Muglia was born. She took her family, and Muglia enrolled in school and learned English.

Later, Muglia discovered this was more than a convenient coincidence. "She did collaborate with colleagues in Rhode Island during that time, but her main goal there was for me to learn English and to have the experience of living in the U.S. I used to think it was the other way around."

Muglia's mother did not get to see him use this gift on his own path toward becoming a scientist, as she passed away while Muglia was in high school. But Muglia took full advantage of his mother's foresight when he received his Ph.D. from CEOAS this past June.

In a way, earning his Ph.D. also meant he was joining the family business. He grew up supported by two scientist parents — his father is a retired geologist who assisted in the building of bridges and dams — who were thrilled when he began to lean toward science as well.

In fact, Muglia says he wanted to be an academic scientist since the first two or three years of elementary school.

Like so many kids who want to climb mountains, smash rocks or dig up dinosaur bones, Muglia's interest leaned toward geology and paleontology. As a teenager growing up in the Patagonia region of Argentina, Muglia spent summers at the beach swimming and kayaking, which led to an intense interest in ocean science as well. These disciplines marinated in his mind and eventually crystalized into his current interest in paleoceanography.

Muglia finished high school and went to the National University of La Plata, where he studied physics. When it came time to apply to graduate schools, he wanted to combine physics and his love of the ocean in the study of physical oceanography, so he sought the advice of two prominent oceanographers, Argentinian Alberto Piola and Ricardo Matano, a CEOAS faculty member who led a short course in Buenos Aires that Muglia attended. On the advice of both, he applied to Oregon State.

After he applied, he received an email from CEOAS Professor Andreas Schmittner offering him a spot in his lab working not on a physical oceanography topic, but on a paleoceanography project.

"I had never heard of paleoceanography. I didn't know it existed," marvels Muglia. But, since it combines elements of physics, oceanography and his old loves — geology and paleontology — it seemed like a perfect fit.

For his Ph.D. thesis project, Muglia used a mathematical model to examine the relationship between ocean currents and deep-ocean carbon storage during the last glacial maximum (LGM), popularly referred to as the last Ice Age, about 20,000 years ago.

During that time, Muglia explains, the CO_2 in the atmosphere was much lower than it is today — it can be measured in air bubbles trapped deep in large ice sheets. Other research has revealed that the missing CO_2 was residing in the deep ocean. Carbon concentrations in the deep ocean, partially controlled by ocean currents, can be measured by examining the ratios of isotopes in tiny fossil shells (there's the paleontology piece) found in ocean cores (there's the geology). By adjusting parameters of the ocean circulation model (physical oceanography) to match the observed ratios, Muglia can determine what the circulation must have looked like.

His results indicate that the main current that carries heat from the southern hemisphere to the northern

hemisphere in the Atlantic Ocean must have been significantly slower during the last Ice Age; it's also likely that primary productivity in the Southern Ocean was much higher. Together, these factors led to enhanced carbon storage in the deep ocean. Muglia will continue studying these dynamics as a post-doc in Schmittner's lab, this time looking at what happened to ocean circulation as the last Ice Age gave way to deglaciation and an interglacial period.

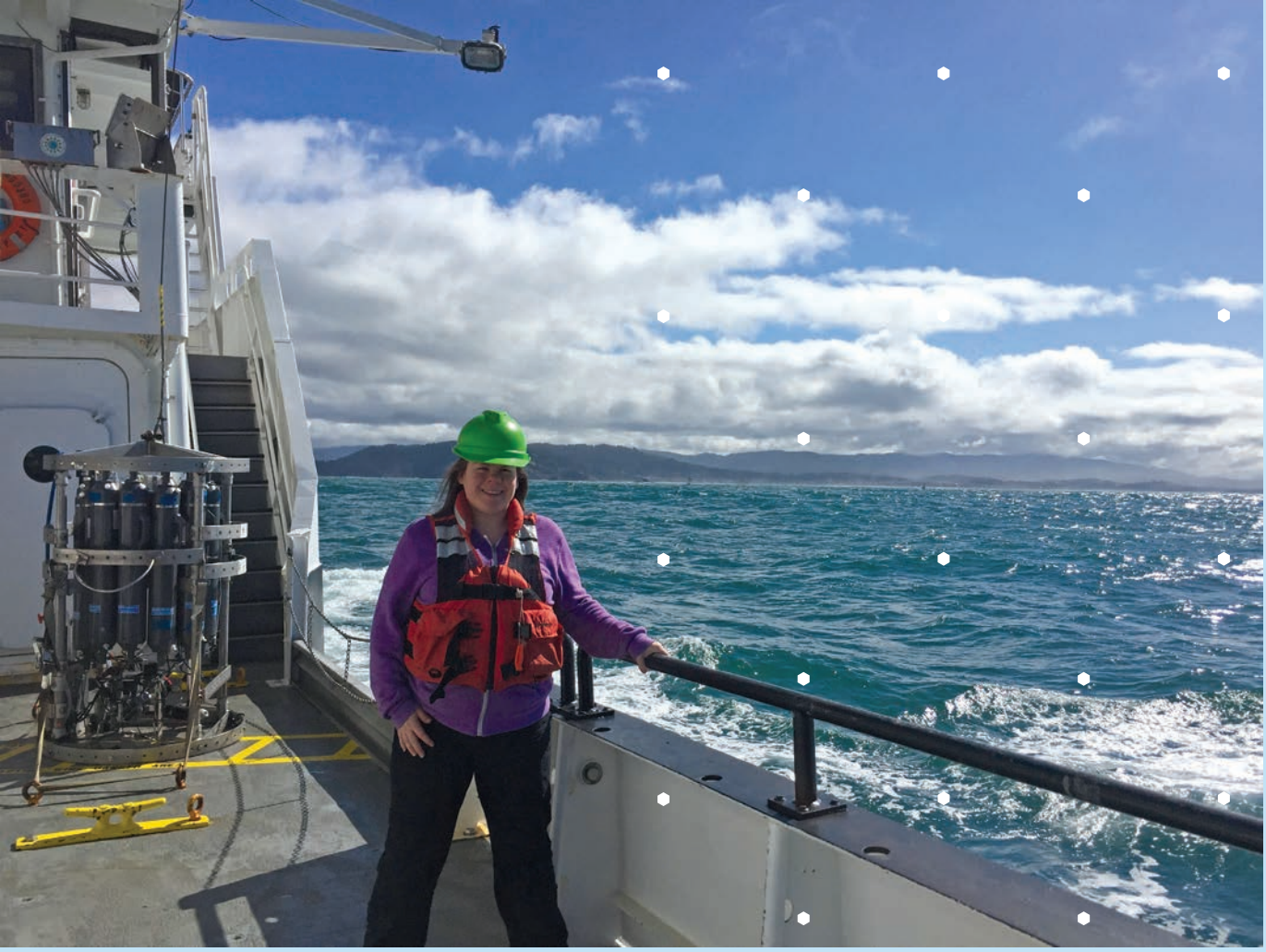
Why study the state of the ocean 20,000 years ago? "The climate system is not static. If we want to understand what will happen with the Earth's climate in the future, we have to understand how it changed in the past," Muglia explains.

Muglia has plenty to keep him busy when he's not in the lab, as his wife, studying for her Ph.D. in fisheries and wildlife at Oregon State, had a baby boy in April 2017. Will their son Salvador carry on the family's science tradition? Step one is loving the water, and Muglia is happy to report that that box is checked. He and his wife have taken the baby to rivers and swimming holes each summer weekend, maintaining that connection to the water.

"We took him into the cold water of Three Pools and he didn't complain!" Muglia recounts with a grin. Perhaps the next generation of Muglia scientists is in the works.

Andreas Schmittner investigates oceans and climate, from past to future.

Professor Schmittner is interested in the big picture — the very big picture. He studies the Earth's entire climate system, with an emphasis on the role oceans play in cycling nutrients, carbon and productivity, both today and in the past, decades to millennia ago. Using computer models, he seeks to understand today's global ocean circulation, how and why it has changed, how it may change in the future due to natural or human influences and how it impacts climate and ecosystems.



Morgaine McKibben forecasts harmful blooms to help protect fishermen and coastal economies.

The state of Oklahoma is roughly 1,100 miles from the Pacific Ocean and 1,300 miles from the East Coast. It's as far from the ocean as you can get. But growing up there didn't stop Morgaine McKibben from dreaming of the water. Now her research on phytoplankton is shining new light on delicate marine ecosystems.

When McKibben was a little girl, she became obsessed with the ocean, a place she had never seen. Supported by her science-loving parents, she covered her bedroom walls with photos and posters of the marine environment and watched Jacques Cousteau specials. She was eight years old when she finally stood on the shores of the Pacific on a family trip to San Diego.

Her reaction? "I was blown away," she says.

Once she began taking middle and high school science classes, biology in particular, her future became clearer. There was no question about her college major: it would be marine biology at the University of California at Santa Cruz.

"It was a life-long dream, to live that close to the ocean. Being from Oklahoma, I didn't know that places could look the way Santa Cruz did — it looks like you live in a postcard every day," she recalls.

At UC Santa Cruz, she volunteered on research cruises and took every marine biology course she could squeeze into her schedule. She knew that she would continue on to graduate school but was having trouble zeroing in on an exact topic of interest.

Finally, one moment in an oceanography class in her junior year brought everything into focus. The professor introduced her to the difference between marine biology (the study of individual marine organisms) and biological oceanography (the study of how organisms both shape and are shaped by the physics, chemistry and geology of the ocean). Biological oceanography was exactly what she had been looking for.

McKibben only applied to one graduate program: oceanography at CEOAS. She signed on with Angel White's lab, earning both a master's and Ph.D. working on phytoplankton bloom dynamics in Oregon waters.

Her favorite part of her graduate research, hands down, was fieldwork on ocean-going cruises. "Those 12-plus hour days can be really grueling, but I find that work so gratifying," she says. "I love to just take a moment to look around when I'm on the water and say, 'wow, I'm working and I'm on a ship.' That love of the ocean, of being on it and near it, never waned."

Her love of fieldwork served her well as a graduate student, as her research project required collecting oceans of field data for a program called Monitoring Oregon Coastal Harmful Algae (MOCHA), funded by the National Oceanic and Atmospheric Administration (NOAA). MOCHA was a five-year effort to intensively study harmful algal bloom (HAB) occurrences in Oregon and investigate the ecological mechanisms behind them.

One aspect of this work, published in the prestigious journal *Proceedings of the National Academy of Sciences*, created some media buzz: the scientists examined occurrences of blooms of diatoms of the genus *Pseudo-nitzschia*, which sometimes produce the neurotoxin domoic acid. This toxin can accumulate in the tissues of species such as Dungeness crab and razor clams and can impact human health if people consume the tainted seafood. Lucrative Oregon fisheries were shut down multiple times in recent years because of high domoic acid levels, so an understanding of what factors might cause this type of bloom is far from purely academic.

McKibben, White and their colleagues determined that the warm-water phases of natural oscillations in ocean conditions are strongly associated with toxic blooms in Oregon. What's more, they found that these results could be extrapolated to the entire West Coast. Ultimately, McKibben hopes their findings will lead to an improved ability to forecast domoic acid outbreaks, providing a much-needed crystal ball for the fishing industry and coastal communities.

McKibben's experience made her the perfect candidate for her new job with the San Francisco Estuary Institute (SFEI), a nonprofit that conducts research and monitoring to steward the waters of San Francisco Bay and nearby ecosystems. She is responsible for a program examining nutrient loadings and their potential impacts on phytoplankton communities and blooms, including HABs, in the bay. SFEI partners with many government and academic institutions to collect and analyze data, and McKibben was delighted to discover that one of her new collaborators would be a familiar face: the professor whose introductory oceanography class turned her on to this field as an undergraduate at Santa Cruz.

Admittedly, she's not going to sea as much as she used to. "I'm excited to be turning my skills toward applied science, asking important questions about how human activity affects the estuarine environment," she says, proudly.

Asking big questions about the sea's smallest

Morgaine McKibben earned her Ph.D. in the lab of CEOAS Associate Professor Angelicque White, a biological oceanographer whose work focuses on the role of phytoplankton and microbes in marine ecosystem function. White asks big questions: how does nutrient cycling affect phytoplankton productivity? What role do microbes play in the ocean and how might that role change as the climate changes? In addition to the MOCHA project on Oregon harmful algal blooms, she is an investigator in the Simons Collaboration on Ocean Processes and Ecology (SCOPE), which aims to characterize how energy and matter move among microbial groups at a North Pacific research site near Hawaii.

Donors love funding the transformation from pupil to practitioner.

Larry and Caron Ogg had a vision for graduate students in the sciences when they approached the OSU Foundation and the College of Earth, Ocean, and Atmospheric Sciences about creating an endowed scholar award. While neither had attended Oregon State or gone into the sciences, they cared deeply about investing in programs that nurture future leaders who are exploring important ocean-related issues.

"Everybody needs to understand the atmosphere, the ocean and how they affect every day of our lives," Caron says. "We were so impressed with the college and how they were doing nationally."

Through Caron's involvement with the Achievement Rewards for College Scientists (ARCS) Foundation, the Oggs created Oregon State's first ARCS endowed scholar award in partnership with CEOAS. Established in 1958, the ARCS Foundation is a nationally recognized nonprofit started and run entirely by women who aim to advance science and technology. The endowment will support CEOAS graduate

students in perpetuity, allowing recipients to take advantage of opportunities that may have otherwise been unattainable. Several other colleges at Oregon State now offer a similar ARCS endowed scholar award.

"It allows Oregon State to recruit the best and brightest here," Larry says. "If they can offer students a little extra money, that could be the thing that makes them come down to Corvallis."

Building relationships with recipients

Caron has been involved in leadership positions with the ARCS Foundation both nationally and through the Oregon chapter, which was incorporated in 2004. Since that time, the chapter has supported 225 graduate students with scholar awards totaling $3.7 million.

Caron says the organization is unique because scholars and donors have an opportunity to make a connection and establish rapport. The Oggs, for example, recently attended the Ph.D. defense of CEOAS ARCS scholar, Liz King (see accompanying photo).

"Sometimes when you give money, it can go into a black hole. With ARCS, you get to know the scholar, and I think it's really important to have a relationship with them," Caron says. "Many of our scholars tell us they see us as a support group that is interested in science and what they are trying to achieve. And it's good for the donors because we get to see these bright students do amazing things."

Indeed, the Oggs have seen CEOAS students explore every facet of the earth sciences — from climate change to natural hazards. CEOAS ARCS scholars are studying magnetic minerals deep within the ocean floor to unearth important clues about monsoons. They are learning how elements cycle through the environment and connect the air, sea and land. They are using robotic floats to analyze how the marine carbon cycle in the Southern Ocean changes over space and time. Their explorations will help uncover new ideas and innovative approaches to the complex issues of planetary-scale science.

Both Larry and Caron say they are proud to watch students transform from pupil to practitioner.

"The best part is, when the students leave here, you keep in touch and get to see them go off into the world," says Larry.

A passion for education led to giving

Both Caron and Larry were ardent supporters of higher education well before their involvement with ARCS and Oregon State. For Caron, who grew up in Tacoma, there was no question whether she was going to attend college. "All four of my grandparents are college graduates, including my grandmother on my mother's side, who majored in chemistry," Caron says. "It was just ingrained in us that education was important." While her entire family went to the University of Washington, Caron broke tradition by attending Washington State University in Pullman, earning her degree in interior design in 1968.

Unlike Caron, Larry was the first in his family to attend college — and he is well aware of the opportunities his education afforded him. He majored in business administration at Washington State, where he met Caron. After graduating in 1967, he immediately went into the Marine Corps for a little over four years.

"I got a diploma in one hand and a draft notice in the other," he says.

Soon after, Larry launched a successful career in banking. He moved up the corporate ladder and retired as president and CEO of Bank of America for Southwest Washington and Oregon after 36 years.

Thinking beyond their alma mater

Besides CEOAS, the Oggs are supporting Oregon State's Marine Studies Initiative, a university-wide effort to expand our understanding of the marine environment and its importance to society. Caron will take an even more active role in philanthropy at Oregon State in her new role as an OSU Foundation trustee.

Even with their deep commitment to science at CEOAS and Oregon State, Larry and Caron stress that they are WSU Cougars through and through, even beaming when mentioning that both their children graduated from their alma mater. But when it comes to giving, the Oggs are driven by passion more than school colors.

"It doesn't matter where people graduate," says Caron. "If there's a cause that someone's interested in, why not?"

If you would like to make a gift or would like assistance as you consider making a gift, please contact: Doug Brusa, doug.brusa@osufoundation.org or 541-207-8686.

Oregon State University
College of Earth, Ocean, and Atmospheric Sciences

College of Earth, Ocean, and Atmospheric Sciences
Oregon State University
104 CEOAS Admin Building
Corvallis, OR 97331-5503
541-737-3504
ceoas.oregonstate.edu