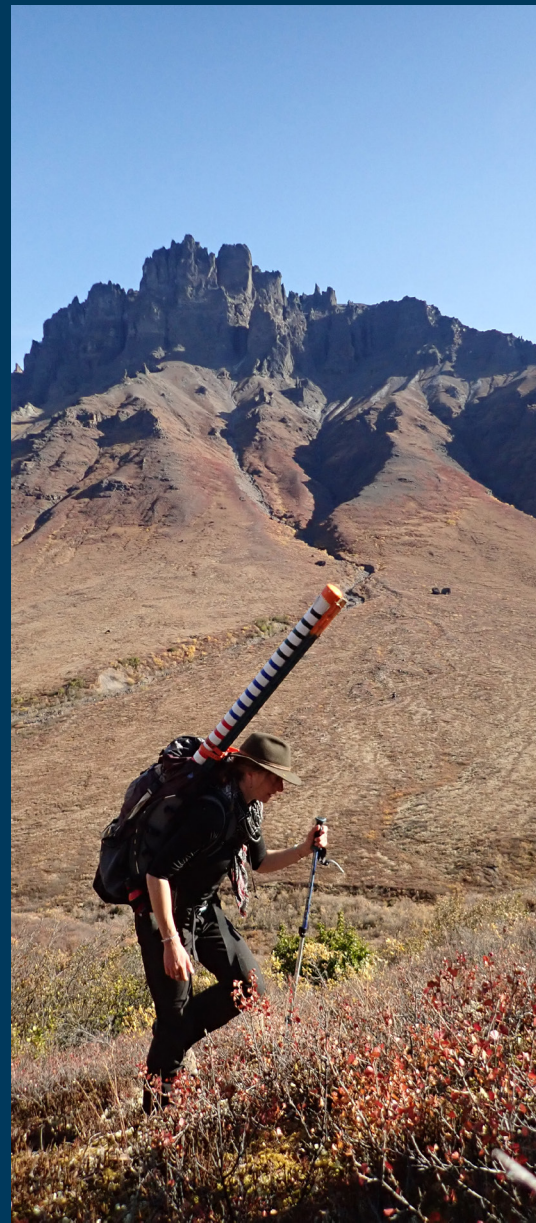


# 2017-18 ANNUAL REPORT

College of Earth, Ocean,  
and Atmospheric Sciences



**Oregon State**  
University



## 1. Performance Indicators:

In spite of an increasingly competitive funding environment, revenue from research grants and contracts is at its highest point in CEOAS's history, totaling \$160M in FY2017-18 (excluding PacWave). While the college's largest grant (for the Regional Class Research Vessel project) supports research infrastructure with significant external contracts, research expenditures within the college, an indicator of research productivity among the faculty, have increased dramatically over the past five years, from \$30M in 2012-13 to \$41M in 2016-17.

Student credit hours (undergraduate, graduate, summer and Ecampus) have been fairly flat since the merger of Geosciences with Oceanic and Atmospheric Sciences. The reasons for slight downturns in upper and lower division SCH have been identified (timing of courses, competition from other units), and we are working to restore these courses to previously strong enrollments. First-year retention rates have hovered at approximately 90% for the classes that entered between 2012 and 2015 – among the highest at OSU. The first-year retention rate dipped in 2016; we are unsure why but will work to understand the reasons more fully over the summer.

Over the past five years, the composition of our student body has shifted in some ways and remained stable in others. Out-of-state students have consistently outnumbered in-state students by more than 2:1 during this period. However, our admitted students in 2017-18 are 58% female, reflecting the growing interest of women in earth and environmental science. The percentage of minority students has increased from 14% to 19% over five years, while the percentage of international students remains constant at approximately 5%.

## 2. Teaching and Learning:

CEOAS continues to improve and strengthen the impact of our academic programs by:

### *Enhancing teaching and advising in ways that raise and equalize student success*

- The college has made significant investments in instructional facilities, including furnishing a classroom in Strand dedicated to active learning and refurbishing our primary computational classroom with state-of-the-art workstations in support of our GIScience and Geospatial course offerings.
- Now in its second year, the college's Academic Mentoring Program (AMP) connected 31 graduate mentors with 27 undergraduate mentees. This program provides undergraduate mentees an opportunity to foster connections with researchers, develop professional skills, and prepare for graduate education in the sciences. CEOAS plans to offer the program again next year.
- The college maintains a stable and highly knowledgeable team of advisors who provide direct support to our students.

### *Promoting responsible citizenship and global awareness among students*

- A group of CEOAS graduate students created a professional learning community around "Unpacking Diversity," organizing five learning sessions on a variety of topics including racism, sexism, social justice, and power relations within academic settings. This is discussed further in section 5, below.

### *Advancing learning through course and program (re)design, program assessment, and faculty development*

- In September 2018, the college will host a two-day workshop on educational pedagogy, course design and active learning that will be open to all faculty. The workshop was awarded and organized by the National Association of Geoscience Teachers and will be facilitated by experts from Princeton University and the University of Illinois, Chicago.



- The Undergraduate Program Committee undertook an assessment of the Earth Sciences degree (B.S., with options in Climate Science, Geology and Ocean Science). On the basis of the assessment, the college plans to restructure the degree by elevating each option to an individual degree. By increasing the visibility of these degree options, we anticipate growth, particularly in Ocean and Climate Science.

#### *Online and hybrid-delivery education*

- The college is developing a new B.S. in Geography and Geospatial Science that will be entirely offered through Ecampus. Course development is in progress, and the degree will be available by 2019-2020.
- Our minor in Earth Sciences is now available entirely online, effective 2018-2019.
- We have increased our offerings of hybrid course delivery in the Geography and Geospatial Science degree.

#### *The development of new pedagogical models*

- CEOAS instructors continue to explore more effective means of engaging students in the classroom. Demian Hommel in Geography has employed Top Hat, a third-party online classroom environment that works with student mobile devices, to create active learning experiences in large classrooms. As part of the implementation of an online B.S. degree in Geography and Geospatial Science, faculty plan to develop an online field course that will fulfill experiential learning goals in that degree program.

#### *Enhancing the integration and success of international students*

- With our relatively small international student population, the college's efforts center on personal interactions between advisors and students that identify and provide solutions tailored to individual needs.

#### *Enhancing the comprehensive Healthy Campus Initiative*

- Our small class sizes, emphasis on experiential learning, and vibrant culture of mentoring students in research ensures multiple points of connection and community among our student populations.

#### *Advancing the Marine Studies Initiative*

- The college has partnered with MSI to offer Biological Oceanography (OC 440) at the Hatfield Marine Science Center in summer 2018. We also have supported internships and research credits offered through HMSC, and we jointly support graduate student teaching assistants for a high school ocean science competition, Salmon Bowl.

#### *Growing programs at OSU-Cascades, Newport and Portland*

- NEWPORT: See above. In addition, as the MSI liberal arts degree takes shape, CEOAS will provide foundational courses in marine science that dovetail with themes in social sciences, humanities and arts.
- CASCADES: CEOAS leadership met in May 2018 with OSU-Cascades Dean of Academic Affairs Julie Gess-Newsome to discuss joint programs. Plans are in place to offer our Environmental Sciences B.S. degree in Bend; to that end, we have had extensive discussions with OSU-Cascades faculty, and a draft proposal is planned for review by the Curriculum Council. We remain poised to develop additional programs as the OSU Cascades student enrollment grows.



- PORTLAND: CEOAS continues to consider course offerings that might be attractive to Portland-area residents including advanced Geospatial Science courses or a certification in Geology. These will receive closer attention as the Portland campus and enrollment become more established.

*Recruiting diverse and high-achieving students*

- The college maintains partnerships with the Graduate School and other graduate programs in hosting booths at the annual Society for the Advancement of Chicanos/Hispanics and Native-Americans in Science (SACNAS). This venue has been successful for attracting applications to our graduate programs.
- In 2017, we implemented a direct-mail outreach to all admitted students and have made personal contact with high-achieving high school students who identified an interest in our degree programs. We also participated in OSU Night in Portland.

*Other initiatives focused on teaching and learning*

- The successful NSF-funded Research Experiences for Undergraduates (REU) program was renewed this year, providing an additional three years of student research in labs on the Corvallis campus and at the Hatfield Marine Science Center in Newport.

### 3. Research and Creative Work:

*Attracting and retaining exceptional faculty*

Over the past three years, we have engaged in six dual career negotiations; five of the six couples were either successfully hired or retained. In some of these negotiations, CEOAS diversity was increased through hiring of a female or veteran.

For FY18

- We have successfully retained one faculty member who was courted by another R1 institution, as part of a dual career couple negotiation.
- We are evaluating another spousal hire that would allow CEOAS to add a highly successful mid-career female faculty member to our ranks. This addition would increase our diversity and our competitiveness in polar research.
- We were unable to retain a star female faculty member who was offered a leadership opportunity at another University that we could not replicate.
- We were unable to retain a faculty member who left OSU for a permanent position at a federal laboratory.

Motivated by recent and upcoming retirements, CEOAS engaged in a novel strategy to establish hiring priorities. The leadership solicited both disciplinary and interdisciplinary position descriptions from the entire college and encouraged faculty to work across disciplinary lines to develop positions that crossed these boundaries. We then held a college-wide forum to present and discuss both new and traditional areas for investment in faculty positions. As a result of this effort, five new positions are currently being developed that cover a wide range of topics that have potential connections to other university units, including interdisciplinary graduate programs. The hiring plan could significantly diversify our faculty, and rigorous processes are in place to assure a diverse pool of candidates.



Finally, in order to retain and support our faculty, we have expanded faculty development activities. We organized nine faculty development events, including proposal success workshops and panel discussions on graduate student advising, managing research groups and interactions with funding agencies. CEOAS has also hosted multiple sessions of the Social Justice Education Initiative, with separate sessions geared towards CEOAS faculty, staff, and graduate students/postdocs.

#### *Cultivating transdisciplinary research*

- CEOAS faculty collaborated in the preparation of a successful NSF proposal to organize a multi-disciplinary workshop entitled “Integrating Science Needs with Advanced Seafloor Sensor Engineering to Provide Early Warning of Geohazards;” workshop is scheduled for July 12-13, 2018.
- CEOAS faculty collaborated with COE faculty to submit an NSF Engineering Research Center (ERC) planning proposal entitled “Engineering Research Center for Adaptive and Resilient Coastal Infrastructure.”
- CEOAS PIs submitted various proposals in collaboration with PIs from other colleges, such as Forestry, Engineering, Science, and Liberal Arts.

CEOAS continues to be home of the NSF Research Traineeship (NRT) program in Risk and Uncertainty Quantification in Marine Science and Policy. The program, finishing its second year, supports transdisciplinary teams of graduate students and faculty from CEOAS, College of Science, College of Engineering, College of Liberal Arts, and College of Agriculture, among others.

#### *Increasing the quality, capacity and impact of graduate programs*

The NRT program is implementing innovative approaches to graduate education that are affecting both the quantity and quality of students on campus. The transdisciplinary training emphasizes actionable and societally relevant science, thereby broadening the employment potential of participating students.

#### *Growing external research funding*

In FY2018, CEOAS

- Successfully competed for funds to continue operations of the Ocean Observing Initiative (OOI) instrumentation. The award will commence in 2018, attracting \$8M in external grant funds to the college annually.
- Assumed leadership of the \$35M (over three years) wave energy test facility funded by the Department of Energy.
- Successfully competed for funds from the Murdock Charitable Trust to enhance its analytical facilities. The resulting mass spectrometer instruments will serve the entire OSU campus.
- Received > \$200M to construct two of three regional class research vessels, one of which will remain at OSU and replace the Oceanus.
- Initiated (and nearly completed) the construction of the new Marine & Geology Repository. Samples will be moved into the new facility from mid-July to early August.

This year also included visits to Capitol Hill, and in some cases delivery of Congressional testimony, by Prof. Burke Hales, Associate Dean Tuba Ozkan-Haller, and Dean Roberta Marinelli, on topics such as university-led technology development, blue technology and coastal navigation, and research investments in Oregon. All visits were conducted in collaboration with Ms. Gabrielle Serra in OSU Federal Relations.



*Supporting faculty entrepreneurship*

- In Geography, James Watson has started an insurtech company aiming to develop new ocean index insurance products for fishermen and fish-farmers called Big Fish Inc. Watson and his two postdocs have also started a technical consulting company, The Prediction Lab.
- Professor Burke Hales has a small company that develops instruments for measuring oceanic properties.

*Cultivating partnerships with industry and other external stakeholders*

CEOAS faculty are broadly collaborative, seeking to partner with industry, federal agencies and local communities.

- George Waldbusser currently has several projects that engage seafood providers and industry regulators both locally and nationally.
- Adam Schultz maintains industry partnerships in two research areas. The first involves application of geophysical data and algorithms to mitigate damage to the electric power grid from space weather impacts and from electromagnetic pulses related to exo-atmospheric nuclear device detonation. The second research area is geothermal power. Both are supported by federal investments and industry partnerships.
- John Dilles has partnerships with several mineral companies to provide technical assistance in the area of mineral exploration and recovery. He also teaches field classes in which a high percentage of students are from extractive industry.
- Ted Strub and Flaxen Conway continue to collaborate with the tuna fishing community to provide ocean forecasts that enable more effective and safe fishing practices.

#### 4. Outreach and Engagement:

*Outreach and engagement programs as vehicles for facilitating high-impact learning*

- The total solar eclipse (and OSU150 kickoff) was a great opportunity to promote science, CEOAS, and OSU to visitors. CEOAS scientists Randall Milstein, Marty Fisk, Jon Fram, Kathie Dello and Rick Colwell presented talks and public forums (some standing-room only) for visitors and the media, bringing to life this historic skywatching event. Our alumni stayed in OSU dorms and also camped out in our long-standing field geology site in Mitchell, Oregon. CEOAS was also central to the eclipse ballooning event, where hundreds of students from Oregon to South Carolina launched more than 70 high-altitude balloons along the path of the total solar eclipse to livestream the event from the edge of space.
- CEOAS scientists are visible throughout Oregon and beyond, hosting visitors and providing direct presentations in nonacademic settings, webinars and media interviews. An informal tally of more than 40 events was gathered from just a handful of respondents. Audiences for these topics include the Disaster Resilience Summit/Economic Forum in Portland, Society of American Foresters in Albany, Tribes & First Nations Climate Summit north of Seattle, a science pub in Baker City, and a small forest landowners conference in Eugene.
- Geology graduate students organized a three-day student research symposium in spring called VOLC-OR. The event hosted students from Portland State and University of Oregon who are researching Oregon volcanoes and included lab tours, workshops, and social events.



*Increasing study abroad opportunities and strategic international research partnerships*

- We hosted a two-day delegation of 12 graduate students from France, a collaborative effort arranged by the CEOAS Dean and the Science Attache for the Office of Science and Technology of the French Embassy. The event included lightning seminars and visits to our facilities. Future collaborative activities are expected.
- CEOAS hosted tours and discussions with Kyushu University students and faculty, facilitated through INTO OSU. Other discussions with potential international partners include James Cook University, Australia; and Nanyang University.

*Engaging alumni and other external partners*

- CEOAS's Board of Advisors, an alumni group that meets twice per year, expanded to become more diverse to reflect the variety of outcomes in our graduate degrees. New members participated in an annual on-site professional development workshop.
- CEOAS hosted "Alumni and Friends" receptions at two professional conferences: the American Geophysical Union conference in New Orleans and the Geological Society of America in Seattle. Invitations were extended to all CEOAS alumni and friends living in these geographical regions. Distinguished Visiting Lectures were held in April and May on campus, featuring Dr. Ellen Stofan (now director of the National Air and Space Museum) and Rebecca Moore (with Google Earth Engine). We held our annual college awards ceremony May 18, 2018 and invited parents and donors in order to acknowledge the vital importance of donor-supported awards and scholarship funds.
- CEOAS mailed its annual alumni magazine, Elements, to nearly 6,000 alumni, supporters and friends. The publication focused on graduate student excellence to build momentum toward a fundraising campaign in support of graduate education. A twice-annual alumni e-newsletter was sent to 3,000 people. These communications have established regular and vital touch points with our alumni, friends and supporters.

*Advancing economic and social progress in rural and urban areas in Oregon and beyond*

- As discussed above, Professors Waldbusser, Dilles, Schultz, and Watson are partnering with industry and local communities to advance commerce and provide assistance to make businesses and communities more resilient to shifting climates and economies. In addition, the PacWave test facility will enhance Oregon's coastal economy and provide national leadership in marine kinetic energy.

*Other initiatives focused on outreach and engagement*

- OSU150 Marine Sciences Celebration, February 12, 2018: To celebrate the launch of the Sea Grant segment of the OSU150, as well as the Ocean Sciences Meeting (co-sponsored by three major scientific societies) in Portland, CEOAS helped execute a marine sciences reception at the Oregon Historical Society. The celebration brought together 200 conference attendees, Portland alumni and OSU students/staff in celebration of the newly launched OSU150 exhibit and all things ocean. CEOAS produced various print pieces in support of the OSU150 celebration. Most noteworthy is the cover story of the winter issue of Terra, "Towing the Line," a piece about the decades-long environmental monitoring program called the Newport Hydrographic Line.
- CEOAS hosted the Regional Ocean Sciences Bowl ("Salmon Bowl"), a quiz-style ocean science competition where high-achieving high school teams from across the region test their ocean knowledge.



- Nearly 1,000 students (K-12, undergrad, and grad students) as well as visiting scientists from abroad toured the CEOAS sediment core facility and participated in hands-on activities and lectures.
- In February 2018, the OSU Press published John Byrne's memoir, *UNDERCURRENTS: From Oceanographer to University President*. Dr. Byrne was featured at an event, "Stories from 60 Years of Ocean Science," February 24, 2018, a panel discussion that was moderated by the CEOAS dean and featured seasoned scientists and others on the front lines of studying our changing oceans. About 100 community members attended.
- The Oregon State News & Research Communications office continued to highlight important work emerging from CEOAS this year. Nearly 30 news releases were issued during the year, generating some 250 media pickups. Experts from CEOAS were quoted in major national outlets such as NPR, NOVA, the LA Times, and the New York Times. The CEOAS publications group amplified these pickups by tracking and posting them on the college's website and on our social media outlets. CEOAS also produced about 20 feature stories and four videos celebrating the contributions of our students and faculty in diverse fields, including fisheries oceanography, paleo oceanography, social-ecological systems, geography, geophysics and marine resource management.
- Graduate student professional outreach: Based on an annual survey, more than 90% of CEOAS graduate students attended a workshop and/or conference in 2017-18, with the majority presenting a poster or research talk.

## 5. Diversity and Inclusion:

- To increase awareness of issues affecting recruitment and retention of students, faculty and staff of diverse backgrounds, CEOAS hosted sessions covering the Tier 1 curriculum of the Social Justice Education Initiative. Separate but parallel sessions were organized for faculty and graduate students/postdocs. FRAs and other staff were encouraged to attend the campus sessions to avoid any conflicts. Forty-two faculty members and 29 graduate students/postdocs participated in the events.
- A group of CEOAS graduate students formed the "Unpacking Diversity" professional learning community and organized five learning sessions (described above). The sessions were well-attended and well-reviewed. The Unpacking Diversity efforts will continue into the new academic year with new student leadership. <https://unpackingdiversity.wixsite.com/ceas>.
- To ensure our faculty hiring process is inclusive and attracts diverse candidates, all searches will include a search advocate and increased oversight by the dean.
- CEOAS continues to participate in OREGON STATE ADVANCE. There are now 10 ADVANCE graduates among CEOAS faculty (in addition to an ADVANCE PI and co-facilitator) including all three associate deans of the college. Further, Professor Shan de Silva was awarded the ADVANCE fellowship for 2018 and is coordinating ADVANCE action plans within the college.
- CEOAS Dean Roberta Marinelli was a member of a National Academy of Sciences, Engineering and Medicine committee which conducted an 18-month study of sexual harassment in academia. The report, entitled *Sexual Harassment in Academia: Climate, Culture and Consequences*, was released in June of 2018 and received media coverage in the New York Times, the Washington Post, Nature, Science, the Associated Press, NBC News, Time Magazine, Scientific American, The Chronicle of Higher Education, Inside Higher Ed and many other top-tier news outlets. Marinelli has offered to brief the Provost's Council and President's cabinet on the National Academy study.





## 6. Faculty and Staff Development and Support:

- CEOAS has expanded its college-sponsored professional development and mentoring activities, offering nine events ranging from proposal success workshops to panel discussions on graduate student advising, managing research groups, and interactions with specific funding agencies.
- CEOAS has enabled (with matching funds graciously provided by the Provost's Office) four of its junior faculty to participate in the "Faculty Bootcamp" program offered by the National Center for Faculty Development and Diversity.
- CEOAS Student Services' staff and professional faculty have been encouraged to attend at least one professional development event each year; this year the Advising team attended a regional professional conference in Portland. Classified staff have chosen to pursue release of work time to attend trainings, webinars, etc., across campus and close to town.

## 7. Resource Stewardship:

- Academic Programs: We have hired an Assistant Dean, Kaplan Yalcin, to assist with curriculum development, streamlining and budgeting. Yalcin has identified areas in which we have lost student credit hours and determined possible causes for these losses.
- Research and related programs: The CEOAS business office, working closely with OSRAA and PCMM, has developed significant expertise in development and operations of large facilities and research infrastructure. This expertise allowed us to smoothly integrate PacWave into the college. CEOAS now has a shared position with OSRAA in support of large programs that involve research infrastructure.
- CEOAS requested that OSU Audit Services conduct an internal audit of OSU Ship Operations. The internal audit identified several financial and procedural weaknesses that we are working to correct. We have developed a rigorous timeline, including metrics and desired outcomes, with the goal of full compliance over the next three to six months.
- Philanthropy: CEOAS has been without a development officer for much of the past year, after Doug Brusa moved to the PacWave project. A new CEOAS development officer, Amy Crumley, was hired in June after a national search. Between the departure of Brusa and arrival of Crumley, the CEOAS leadership team met regularly with Ben McLuen, senior development director for the earth systems science division; participated in fundraising activities and meetings organized by Martin Grenzebach's team; and continued its work to bridge strategic and fundraising goals. CEOAS has also established stewardship procedures to ensure that donors receive personal thanks for their gift, and that specific outcomes of philanthropic activities are provided to our more significant patrons. CEOAS was the first unit to meet its Student Success Initiative fundraising goal, bolstered by a \$1M gift to endow the Geosciences Field Camp.



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