1. **Provide a transformative educational experience for all learners**

   - **Experiential learning:**
     - All undergraduate students in CEOAS have at least 3 and up to 12 credits of experiential learning required in their degree program. The “flag”ship of this program is our ship bootcamp which, funded by private philanthropy, allows undergraduates to go to sea on the OSU research vessel, R/V Oceanus. CEOAS strong research provides excellent opportunities for experiential learning. For example, in September 2016, students will be simultaneously on board research vessels in the Chukchi Sea northwest of Alaska and off the coast of Antarctica studying ocean biogeochemistry and ecology.

     - The college sponsors 5 student organizations to broaden the student experience, build cohort, and the major GEOCLUB field trips are experiences of a life time (Grand Canyon last year; New Zealand next year). A student exchange with China is in development.

     - The Environmental Sciences program is fostering a new field-oriented experiential learning pilot course on the Willamette River, "Finding Yourself in the Watershed”.

     - Undergraduate and graduate programs in Geology remain vital. Geology uses the resources of our large research institution to provide a thorough educational experience grounded in fundamental field experiences but enhanced with modern analytical methods and technological tools. Field schools in northern California (sophomores) and eastern Oregon (seniors) are a highlight of the undergraduate experience.

     - The college is developing an exchange program with China University of Geosciences in Wuhan. Final arrangements are pending, but the plan is that students will spend ~4 weeks studying with counterparts in China, perhaps as soon as 2017, with the expectation of a return visit by Chinese students in the subsequent year. The longer-term plan is to have the two experiences back-to-back with the same cohort in both countries.

     - The CEOAS experiential learning/internship coordinator has implemented new ways for tracking for credit and volunteer research activities by students and maintains a popular e-newsletter that connects student to opportunities.

   - **New faculty, courses, and degrees:**
     - CEOAS hired five new tenure-track assistant professors in tracer oceanography, natural hazards, geovisualization, sediment transport, and marine microbiology.

     - Five college faculty are helping to develop the marine-focused degree tracks as part of the Marine Studies Initiative (MSI).
The Climate Science Option was approved in December 2015, and the first student (who had been tracking with the option for several quarters) graduated in Winter 2016. The second student graduated Spring 2016 and was awarded a prestigious NASA Earth Science Fellowship.

The Ocean Science option, which began in July 2015, is now an integral part of the undergraduate offerings within CEOAS and functions as a *de facto* major in oceanography. Attracting students from within the University and across the nation, the OS option now has approximately 30 majors and continues to grow. Undergraduate students are actively participating in internship and research opportunities throughout the College often at sea.

The college is developing a new Geography and Geospatial Sciences program, which is in final stages of approval.

A new online undergraduate certificate in Geographic Information Science has been approved and adds to the existing offering of the online GIS graduate certificate.

In the Environmental Sciences program, we completed new and revised specializations, undergraduate research projects, access to diverse courses and internships for both online and on-campus students, and steady enrollment of students seeking a strong, interdisciplinary background to address environmental issues.

As part of the development of new majors, the undergraduate introductory courses have been revamped and six new or substantially new baccalaureate core offerings have been added.

- **Student success:**
  - Tracking with the university, CEOAS had its largest number of undergraduates ever and declined slightly in graduate students.
  - The CEOAS Board of Advisors hosted two workshops to assist students in preparation for the workplace.
  - Student success would be enhanced by greater access to cutting-edge technology.

2. **Demonstrating leadership in research, scholarship and creativity while enhancing preeminence in the three signature areas of distinction**

- CEOAS generated approximately 60 science news stories this year. A few highlights follow.
  - **Ocean surface connected globally on 10-year timescale.** Different patches of the world’s ocean surface are biologically connected on a timescale of about 10 years.
  - **Better way to measure sea level.** A new data set covers the entire U.S. West Coast, with improved sea level estimates extending from the coastline to approximately 40 miles out.
  - **Land-based carbon played a significant role in ending the last ice-age.** Land-based carbon sources contributed to abrupt increases in atmospheric carbon dioxide after the last glacial maximum.
• **Troubled oyster industry saved by science.** CEOAS researchers collaborating with industry and government developed a way to save Northwest oyster industry from ocean acidification.

• **Cascadia subduction zone earthquakes are somewhat more frequent than thought.**

• *Large impact on OSU research.* A literature search shows that from 2010 – 2015 (6 years, inclusive), CEOAS research produces more than 40% of all of OSU’s publications in the world’s two premier scientific journals, *Science* and *Nature*.

• This year, student research appeared in several high profile publications in *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences*.

• Management of OSU ships:
  - OSU’s R/V Oceanus continues to maintain heavy cruise schedules with almost 200 days on the schedule 2016 and over 200 days planned for 2017. This year the ship sailed to the Gulf of California, Hawaii and the Aleutian Islands.
  - All three of OSU’s ships are now managed through a central Ship Operations in CEOAS, following transfer of the R/V Pacific Storm from the Marine Mammal Institute. The vessel will be available year-round, increasing OSU’s capacity to support research, education and outreach.
  - CEOAS continues as the lead institution for the Regional Class Research Vessel (RCRV), the next generation and cutting-edge intermediate-range research vessel. In August, we released a request for proposals (RFP) to construct up to three RCRVs.

• CEOAS works to support our faculty in acquiring and maintaining analytical instrumentation for the study of the earth, ocean, and atmosphere. For example, we will acquire a new Multi-Collector Inductively Coupled Plasma Mass Spectrometer for isotopic studies in earth sciences, fisheries, forest ecology, environmental engineering, anthropology, and forensics.

• At the same time, our research capabilities would be significantly improved by greater support for state-of-the-art equipment and more high-quality space in which to put it.

• The college upgraded its research computer system to include a 10 Gbps fiber optics connection to the Ocean Observing Center in south Corvallis, a college-wide 802.11AC Wifi upgrade, and full replacement of our core computing, storage, visualization, printing and plotting capabilities. In addition, we have increased and extended our high-bandwidth intra-Data Center connectivity capabilities into many offices and labs enabling new workflows for always on, always connected sensor fusion and processing tasks associated with geographic and geospatial modeling; remote sensing; ocean acoustics; ocean circulation; image and video analyses.

• CEOAS is one of the leads for the Ocean Observatories Initiative, where we are responsible for a network of gliders and scientific moorings offshore of Oregon and Washington.

3. **Strengthen impact and reach throughout Oregon and beyond**

• We co-sponsored a two-day symposium on collaborative, community-based solutions to conservation challenges in Kenya and the U.S. West in April titled “The Future of Pastoralism in an Era of Rapid Change”. The symposium featured leading thinkers –
researchers, community leaders, ranchers and pastoralists – from both countries who
shared their practical and scholarly knowledge about the current state and future
prospects of the world’s grasslands, which comprise a third of the planet and provide
livelihoods for local residents, habitat for a diversity of species, and critical ecosystem
services for the rest of us. A central goal was to promote transdisciplinary international
research on sustainable agriculture and resilient rural communities involving ongoing
cross-fertilization between conservation practice and scholarship. The symposium helped
strengthen a nascent network of researchers and practitioners who will work together in
the future on comparative international research.
• CEOAS faculty continue to help lead the planning and implementation of OSU’s Marine
Studies Initiative (MSI). This includes the co-leadership of MSI by CEOAS faculty
members Jack Barth and Bob Cowen, and the service of several CEOAS faculty members
on the MSI Academic, Research, and Outreach, Engagement and Partnership
Development committees.
• CEOAS continues to operate and maintain ocean infrastructure that benefits both the
Corvallis and Newport economies. This includes operating three ocean-going research
vessels and the Endurance Array of the Ocean Observatories Initiative that together
contribute several million dollars annually to the Newport economy.
• CEOAS faculty worked with the Whiskey Creek, Oregon, shellfish hatchery to maintain
the production of oyster larvae in the face of challenges from ocean acidification that can
adversely impact early-life stages of oysters. The Whiskey Creek oyster larvae are used
up and down the west coast in the multi-million-dollar commercial oyster industry.
• Three CEOAS faculty served on the West Coast Ocean Acidification and Hypoxia
Science Panel that engaged with ocean stakeholders and government policy makers to
write a comprehensive report on the challenges and possible solutions to the increase in
ocean acidification and low-oxygen zones along the US west coast. Ocean acidification
and hypoxia are major challenges to sustaining healthy wild fisheries and shellfish
aquaculture. CEOAS researchers are involved with the Pacific Coast Collaborative Ocean
Acidification and Hypoxia Subcommittee that includes representatives from the offices of
the 3 west-coast governors and the premier of British Columbia.
• The college hired its first Alumni Relations Director to better connect with more than
5000 of our alumni spread across the US and beyond.

4. Key initiatives that align with university commitments

Enhancing diversity

• We have expanded our outreach to student of diversity through a diversity coordinator
(faculty), a diversity committee, and a diversity TA. We have also hired a diversity
coordination assistant for the summer. These employees completed a College Diversity
analysis to understand our diversity, our challenges, and steps that we can take to
improve. We are implementing some of the key findings, which include deeper and
broader participation in minority community events around the state. These findings and
the personnel investment both motivated and allowed activities including the following:
  • **Louis Stokes Alliance for Minority Participation (LSAMP) Bridge:** CEOAS
    hosted a half-day workshop with hands-on experiences designed to inform incoming
underrepresented LSAMP students about research and educational opportunities within CEOAS.

- **Papalaxsimisha Summer STEM Camp at the Warm Springs Indian Reservation**: CEOAS faculty and student traveled to Warm Springs for a one-day, hands-one summer camp designed to engage and excite Native American middle school students about Earth Sciences and college opportunities at CEOAS and OSU.

- **Summer STEM Camp for Migrant/Latino Students at Madras Middle School**: CEOAS faculty and student traveled to Madras Middle School for a one-day, hands-one summer camp designed to engage and excite middle school students from migrant and Latino backgrounds about Earth Sciences and college opportunities at CEOAS and OSU.

- **4-H Summer Science Camps for Migrant and Multicultural Middle School Students**: CEOAS students participated in a series of 5-day camps at 4-H’s facilities in Salem, including delivering several hands-on educational activities designed to engage underrepresented students at the middle school level in Earth Sciences and college opportunities at CEOAS and OSU.

**Stewardship of resources**

- CEOAS had a record year in private philanthropy, with donations totaling $4.15 million.
- CEOAS committed to renovating the main floor of the Nypro Building to repurpose it for research to host a world-class marine and geology sediment repository. This is conditional upon a pending proposal to the National Science Foundation, which would move the repository to OSU.

**Technology as a strategic asset**

- The college is adding a new 2000 sq.ft. undergraduate geospatial analysis and visualization for education (GAZE) facility in Strand Hall to provide a state-of-the-art immersive visualization wall, an augmented reality area to create and explore three-dimensional terrain as well as a Satellite playground using digital cameras and LIDAR to simulate commonly used Earth-observing satellite sensors.
- We are implementing an instructional pilot project to enhance undergraduate student learning in field-based earth sciences with Apple iPad tablets.
- We have updated the computers (30 systems) and modernized all of our instructional labs (Burt, Strand and Weniger). The upgrades to these labs have added new cutting edge hardware and software tools drawing on strong modeling, data analysis, and visualization components. Students have become increasingly proficient in the use of higher-level languages and tool such Python, Julia and R.
- We will be integrating a Jupyter Notebook Server for use across the climate and related earth sciences curriculum. This server will act as a scientific notebook gateway allowing students to create and share documents that contain “live” code, equations, visualizations and documents.
- The college could use greater funds for technology and equipment for students to use. While the above examples are very helpful, students would benefit from greater access to high-quality equipment.
5. **Performance on college-level metrics**

- **Student Applications**: We continue to have record enrollments at the undergraduate level and steady enrollments at the graduate level. While the great majority of graduate students are funded, this is increasingly challenging with flat federal funding for research and increasing costs.
- Among incoming graduate students, 97% are funded, 19% are minorities, 8% are international, and 57% percent are female.
- Among all graduate students: 11% are minorities, 14% are international, and 52% are female.
- Among all students: 16% US minority, 6% international, 42% high-achieving Oregon high school graduates.
- **Retention rates**: The retention rate for first year graduate students is 96%, compared to the university rate of 91%. Our high level of funding for incoming graduate students certainly helps with our good retention rate.
- **Career Placement**: Exit interview indicate graduates have employment opportunities prior to completing degree with majority gaining employment in their field after 3 month of graduating. According to university data, 85% of undergraduates obtain employment in their field and garner salaries about $10,000 higher than the for average OSU Bachelors student. The Student Services office continues to collect career placement data and will make further efforts to strengthen the ability of CEOAS alumni to provide assistance and mentoring to our current students.
- **Research Funding**: Our awards continue to increase, even in the face of flat federal funding. Last year, CEOAS faculty won awards of over $43M. Furthermore, our realized facilities and administration (F&A) is the largest unit in the university, at $8.4M.
- **Inventions**: Three invention disclosure occurred this past year.
- **Diversity of funding**: NSF continues to be the dominant source of funding, with significant funding from NASA, the Office of Naval Research, the National Oceanic and Atmospheric Administration, and the Department of the Interior. Funding from private foundations remains strong, including from the Vetlesen Foundation which helps to provide a large fraction of our start-up costs for new faculty.