Vision

The College of Earth, Ocean, and Atmospheric Sciences provides world-class leadership and education in observing and understanding the ever-changing earth, ocean, and atmosphere in support of a sustainable planet.

Mission

The mission of the College of Earth, Ocean, and Atmospheric Sciences is to enhance scientific understanding of the planet on which we live through innovative and relevant research, creative and effective teaching, and significant and practical outreach and engagement in support of Oregon State University’s role as a land, sea, space, and sun grant university.

Defining qualities of the College are faculty excellence, leading-edge research, compelling educational and mentoring experiences, state-of-the-art facilities, and leadership in connecting our science to public issues critical to Oregon, the nation, and the world.
Principles

College priorities are based on the following principles.

- **Faculty and Staff Excellence.** The College is built on a foundation of diverse, interdisciplinary researchers, educators, and technical and administrative staff who foster collaboration in world-class research, education, and outreach and engagement.

- **Research.** College faculty, staff and students conduct fundamental and applied research on physical, chemical, geological, and biological processes in the solid earth, ocean and atmosphere, and on relevant aspects of the social science. Researchers apply knowledge and understanding to issues of scientific and societal importance, including climate change, natural hazards, and resource exploration, use, and management.

- **Education and Mentoring.** College faculty and staff inspire, learn with, and mentor present and future earth systems scientists, educators, industry leaders, and citizens. The interdisciplinary curriculum and advanced degree programs share strengths in hands-on and applied research and management strategies built on a firm theoretical framework. Students are an integral part of CEOAS research, education, and outreach and engagement.

- **Leadership, Outreach and Engagement.** The College maintains an active presence in the local, national, and global community through leadership, service, distance education, and outreach and engagement with political and professional leaders.

- **Facilities.** The College develops and utilizes state-of-the-art ocean, land, atmosphere and space-based observation platforms from which researchers gather essential information about the changing planet. World-class laboratory, computing, and archival facilities give the scientific community access to study of the earth system from the atomic level to global simulations.

Forces for Change

The strategic plan for CEOAS recognizes a variety of forces that motivate change in order to continue the excellence and impact of the College. Changes to our planet brought on by climate change affect a broad range of CEOAS interests. These include changes in marine ecosystems, weather, water distribution and use, rising sea level and storminess, and also social response to these physical changes. The latter includes shifting economies, needs for new infrastructure, and even human migrations.

The way in which students and the interested public learn is changing with the emergence of ever-increasing electronic delivery including open access journals and Massive Online Open Courses (MOOC). The MOOC trend must be balanced by opportunities for experiential learning, a strength and priority for CEOAS.

In regards to technology, there are fundamental changes underway not only in the information technology side, but also in the sensor and manufacturing side. The vision of millions (to billions) of sensors blanketing the landscape and the ocean is no longer far-fetched. We will be able to “print” new sensors and new vehicles at prices that are orders of magnitude lower than in the past. Although there may be fewer research ships, we may have even greater “access to the sea.”

On the fiscal side, it is unlikely that federal agencies will be able to provide the same level of faculty salary support that we have had over the last 50 years. State support is also unlikely to grow, so we must explore and embrace opportunities with new partners. For example, partnering with industry and private foundations offers new possibilities. Working across campus with the Colleges of Business and Engineering will help us engage in these new opportunities. As in the past, we must continue to reach out and engage the public and policy makers to both justify the support of our work and to make the maximum use of our knowledge for the benefit of humankind.

During past periods of change, a hallmark of CEOAS has been its ability to adapt and be flexible as new opportunities emerge. We will maintain that flexibility and nimbleness into the future.
CEOAS: A Brief Introduction

CEOAS is one of the world’s premier institutions studying the integrated earth system. Through merger of the former College of Oceanic and Atmospheric Sciences and the Department of Geosciences in 2011, CEOAS is one of the few institutions offering balanced programs and both undergraduate and graduate degrees across all of earth, ocean, and atmospheric sciences and their human dimensions. CEOAS is built on a foundation of outstanding faculty who work together to solve today’s complex, interdisciplinary environmental challenges. CEOAS faculty, presently about 110 in number, attract substantial non-State funding to conduct research and deliver a wide range of academic degrees and training programs. CEOAS faculty and research programs are recognized nationally and internationally and faculty define and lead important earth science initiatives.

CEOAS researchers have contributed to fundamental exploration and understanding of our planet including the discovery of deep-sea hydrothermal vents and the rich chemosynthetic biological communities that surround them on the seafloor. Researchers from the College established the principles of, and in a sense wrote the textbook on, wind-driven coastal upwelling and the coastal ecosystem response. CEOAS researchers established the occurrence and recurrence of Cascadia Zone great earthquakes, and are extending studies of these earth motions both at sea and on land. CEOAS researchers have also made fundamental contributions to understanding water resources and conflicts that arise over this valuable resource. CEOAS researchers have explored from well beneath the seafloor and up into the water column to contribute essential knowledge about gas hydrates, an important energy resource and a source of the powerful greenhouse gas methane.

CEOAS researchers have contributed to the OSU Signature Area of Distinction on “Advancing the Science of Sustainable Earth Ecosystems.” In particular, CEOAS conducts research and education to improve the understanding of the earth ecosystems, and promote sustainability through high-impact public policy involvement. CEOAS researchers contribute to the OSU Signature Area of Distinction on “Promoting Economic Growth and Social Progress” through education and engagement of students and citizens, and through developing innovative sensors and measurement techniques—for example, those that monitor water quality.

The CEOAS financing model is built on the ability of faculty to secure substantial non-State funding through successful grant proposals. Nearly 90% of the CEOAS annual budget is derived from non-State contract and grant-related sources. The research, education, and outreach activities funded by these projects provide the foundation for all College activities.

The CEOAS scientific focus is on integrative earth system science with many examples drawing from processes occurring in the Pacific Northwest. The College strives to ensure the long-term ecological and economic sustainability at a regional and global scale. It works to achieve this through fundamental research, technology development, and the creation of meaningful partnerships within the University, with government agencies and national and international groups, communities and the private sector. CEOAS activities are thus strongly aligned with the OSU Signature Area of Distinction on “Advancing the Science of Sustainable Earth Ecosystems.” In particular, CEOAS conducts research and education to improve the understanding of the earth ecosystems, and promote sustainability through high-impact public policy involvement. CEOAS researchers contribute to the OSU Signature Area of Distinction on “Promoting Economic Growth and Social Progress” through education and engagement of students and citizens, and through developing innovative sensors and measurement techniques—for example, those that monitor water quality.

CEOAS research aligns with the OSU Research Agenda by collaborating with local and global communities in order to anticipate and solve problems and promote a healthy and sustainable world.

CEOAS aligns with the OSU goal to excel in teaching and to provide a successful learning environment. Consistent with OSU Graduate School goals, CEOAS educates a diverse student body in core disciplines while fostering collaboration and effective communication across disciplines. CEOAS is committed to interdisciplinary excellence, increasing diversity, and international student involvement.

The College benefits from engagement of professionals through the CEOAS Friends Board and the CEOAS Advisory Board. The former supports primarily the research enterprise and the latter the academic.
The College is led by a Dean with assistance from an Associate Dean for Academic Programs (0.8 FTE) and Associate Dean for Research (0.35 FTE). CEOAS is organized around four discipline groups rather than academic departments. Each discipline group is represented by two members on the College Advisory Committee. Additional members of the College Advisory Committee represent CEOAS academic degree programs and institutes. Organization around Discipline Groups encourages interdisciplinary research and education, and fosters natural alliances and efficiencies among similar fields of study.

The four discipline groups in CEOAS are:

- **Geology and Geophysics** (G&G) focuses on geological, geochemical, and geophysical processes within the solid earth and its surface, including historical studies of the planet’s past climate and plate tectonic history, studies of contemporary earth structure, and studies of active sediment transport and volcanic and earthquake activity.

- **Physics of Oceans and Atmospheres** (POA) focuses on ocean and atmosphere circulation, turbulent scale mixing, coastal ocean dynamics, ocean–atmosphere interaction, climate variability and change, and atmospheric boundary layer processes.

- **Geography, Environmental Science, and Marine Resource Management** (GEM) focuses on all aspects of coupled earth systems and the human interactions with terrestrial, fresh water, and marine processes, from mountaintops to mid-ocean.

- **Ocean Ecology and Biogeochemistry** (OEB) focuses on the ocean’s biological, chemical, and geological processes, and their interplay, and with the structure and function of ecosystems across space and time, including feedbacks between land, atmosphere, and ocean.

In addition to the discipline groups, CEOAS is home to a number of programs and centers that include the Oregon Climate Change Research Institute (OCCRI) and the Cooperative Institute for Oceanographic Satellite Studies (CIOSS). CEOAS faculty and students are active in cross-campus programs, for example, the Institute for Water and Watersheds and the Water Resources Graduate Program, Oregon Sea Grant, and the Northwest National Marine Renewable Energy Center. The OSU Earth Systems Science division, which includes CEOAS, the College of Agricultural Sciences and the College of Forestry, represents most of the Earth science and education faculty and programs at OSU.

CEOAS offers two undergraduate and four graduate degree programs, as well as certificate programs and several field courses. Many courses are available both on campus and via electronic distance learning. The Earth Sciences undergraduate degree offers options in Earth Systems, Geography, and Geology. The Environmental Sciences undergraduate degree offers an interdisciplinary approach to environmental problem-solving and may be earned either on campus or via the OSU E-Campus. Experiential learning is integrated into all undergraduate degrees through lab-intensive courses, field experiences, and opportunities for internships and undergraduate research. There is an undergraduate certificate offered in Geospatial Information Science (GIScience). Graduate degrees are offered in Ocean, Earth, and Atmospheric Sciences (OEAS); Geography; Geology; and Marine Resource Management. Graduate certificates are available in Geographic Information Science (GIScience), Marine Resource Management, and Water Conflict Management and Transformation. Faculty also advise in the Water Resources and Environmental Sciences graduate degree programs.

**Values**

CEOAS faculty, staff and students hold true the following values.

- Open and honest communication and collegiality, with an “open door” policy to foster conversations.
- A welcoming environment.
- Equity and equal opportunity, with active mentoring of early career faculty in both individual and group settings. We work to ensure all faculty are successful.
- Flat administrative structure with participatory approach to College governance, with faculty closely involved in the strategic direction of the College as well as its leadership.
- Differing roles of faculty in research, teaching, and management.
- Ethical approaches to conducting research, mentoring, and teaching.
- Alumni engagement, advice, and support in College activities.
- Diversity as a source of enrichment and strength.

Because the earth sciences are historically less diverse as a field relative to other science, technology, engineering and mathematics disciplines, we strive to encourage participation by underrepresented groups. As an example, the Increasing Diversity in Earth Sciences (IDES) is a two-year program for undergraduate juniors and promising sophomores, in which students are funded while attending summer training in the earth sciences and work with mentors throughout the two years on a project or internship. Two of our present faculty were recruited via diversity initiatives.

CEOAS also recognizes the importance of developing and mentoring young scientists. Through the CEOAS Institutional Postdoctoral Research Associate program, promising recent doctorates are free to engage in research, obtaining research funding, and are free to engage in teaching, outreach and engagement. These activities occur with the guidance of faculty mentors and regular review. Following the postdoctoral training period, an opportunity may exist, based on mutual agreement of the College and the candidate, to change the position to a research or tenure-track faculty status.
Excellence in research and discovery is key to the identity of CEOAS, and underpins education, outreach and service activities. CEOAS research spans a wide range, including basic research on physical, chemical, geological, and biological processes in the solid earth, ocean, and atmosphere, and on relevant aspects of the social sciences. CEOAS research is a balance of fundamental and applied research, and a mix of individual and group research. The organization of CEOAS in four overlapping discipline groups, rather than in formal departments, facilitates cross-disciplinary thematic studies and encourages a holistic earth systems approach to both pure and applied research problems. Knowledge gained by CEOAS researchers is applied to issues of societal importance, including climate change, natural hazards, resource exploration/exploitation, and the human dimensions of these issues.

CEOAS researchers have provided and will continue to provide leadership for large multi-disciplinary regional, national and international programs. Examples include the creation of the Oregon Climate Change Research Institute (OCCRI), the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), the NOAA-funded Northwest Association of Networked Ocean Observing Systems (NANOOS), and the NOAA-funded Cooperative Institute for Oceanographic Satellite Studies (CROSS). CEOAS faculty also play key roles in creating and leading the NSF-funded Ocean Observatories Initiative (OOI), EarthScope, and Willamette Water 2100 project, as well as helping to lead the Integrated Ocean Drilling Program. CEOAS researchers play key roles in assessing the potential for energy extraction and evaluating the possible impacts to the marine and social environment from such activities. Participation by CEOAS scientists in these multi-institutional, interdisciplinary research programs will continue to be encouraged and facilitated as these large programs provide important research opportunities for the College.

Values

CEOAS faculty, staff and students hold true the following values for a balanced approach to research.

- Balance of discovery-based and applied research.
- Healthy mix of individual and group research.
- Encouragement and active pursuit of interdisciplinary research.
- Integrated earth systems approach.
- Ability to explore complex issues.
- Diversity of funding sources.
- Sharing responsibilities between the College and the individual researchers for technical infrastructure and support staff.
Where We Excel

Key examples of interdisciplinary themes where CEOAS excels include the following.

**Coastal and near-shore oceanography research** develops and uses novel observational, analytical, and modeling tools to study fundamental physical, chemical and biological processes, spanning the coastal zone and beaches, estuaries, near-shore ocean, and continental shelf, and connecting to the ocean interior. These research efforts contribute to sustainable policy, planning, management, and use of the coastal zone and its resources and reduce the vulnerability of coastal communities of place and interest to a range of natural hazards.

**Water resources research** at CEOAS involves not only the natural and social science aspects of freshwater but also their intersections. Surface water, snow, and groundwater hydrology and fluvial geomorphology join forces with water resources policy, planning and management, conflict management and transformation, and water and environmental governance to produce a vibrant, timely, research agenda.

**Climate change research** at CEOAS seeks to understand and ultimately enable prediction of the climate system. Components of this effort include identifying and quantifying past episodes of climate change on multiple timescales; describing current changes in global oceanic, atmospheric and ecological parameters to better understand potential future impacts of changing climate, and understanding and improving numerical models of climate system components. Researchers also focus on the human dimensions of climate change, including climate impacts on human societies, health, economy, energy, food security, agriculture, allocation of resources, and policy strategies aimed at planning, mitigation, and adaptation.

**Elemental cycles and food web research** explores connections between earth, ocean, and life to develop insight into the strengths, weaknesses, and productivity of the planet’s biosocialchemical systems. By using our experience in how to observe, sample, simulate, infer, and model these interdependent processes that scale spatially and temporally (from nano- to macro-volumes and from the distant past to the future) we are better able to project future directions for the living and non-living components of earth.

**Circulation and mixing research in the ocean and atmosphere** at CEOAS includes observational, theoretical, and modeling studies of large-scale flow and fine-scale turbulence in the ocean and atmosphere. Research spans from global scales studied using satellite remote sensing to millimeter scales studied using in situ microstructure, optical, and acoustic sensors. Research includes understanding the way in which advective and diffusive transport mechanisms affect physical and chemical interactions between the atmosphere, ocean, and biosphere.

**Solid earth research** combines geological, geophysical, and geochemical approaches supported by extensive field programs, computer modeling, and analytical laboratory facilities, to develop understanding of fundamental geodynamic, tectonic, and magmatic processes in the earth’s crust and mantle. Important focus areas include the structure and evolution of the ocean basins, the Cascade and other subduction zones and associated earthquakes and volcanoes, mountain-building processes around the globe, and the exploration and management of energy, mineral, and water resources.

**Natural hazards research** seeks to understand and reduce the impacts of a range of hazards including earthquakes, volcanoes, coastal storms, and sea-level rise. For example, geologic and geophysical studies of earthquake histories are combined with geodetic studies of strain accumulation and, in collaboration with colleagues in other departments, studies of impacts on human structures and systems to reduce community exposure to future seismic events. Research on coastal hazards includes new techniques for remote monitoring of coastal processes to support strategies for reducing vulnerability of coastal communities of place and interest to storms, erosion, and tsunamis. These studies will become increasingly important as coastlines around the world are threatened by climate change, rising sea level and increases in the intensity, frequency, and duration of major storms.

**Geographic Information Science research** integrates spatial and temporal information using geospatial reasoning to visualize, conceptualize, and discover patterns in order to reveal fundamental earth system processes and contribute to policy and planning. Approaches include cartography, geovisualization, remote sensing, GIS, spatial analysis and modeling and web mapping, applied to evaluate resources (land, air, water, food, energy, mineral), hazards (earthquakes, volcanism, landslides, floods, tsunamis, wildfire, contaminant spills), and Earth system processes (atmospheric and ocean circulation, ecosystem function, and species conservation).
The Way Forward

The College will maintain world-class excellence in the fundamentals of physical, chemical, geological, and biological processes in the solid earth, ocean, and atmosphere, and on relevant aspects of the social sciences. CEOAS will continue a vigorous program of interdisciplinary research in abiotic and biotic systems in support of a sustainable future for humankind on the planet. While maintaining these core strengths, CEOAS faculty hiring and facilities support will remain nimble to exploit new research opportunities in areas of high interest. A recent example of this approach was the cluster hire in high-latitude studies.

The following are some key opportunities that will extend CEOAS activities and expertise.

Ridge to ridge. CEOAS researchers are well positioned for comprehensive integrated study of earth systems across the continental margin, from the Cascade volcanic arc, across the coastal zone, to the mid-ocean ridge. This effort would seek to further integrate efforts in this broad area from the geological processes that shape the landscape (tectonism, magmatism, and sediment transport), to coastal oceanic, atmospheric, and hydrologic processes, to ecosystems and biogeochemical processes, to human dimensions. Research will become more focused on the complexity of the system, including impacts of climate change and natural hazards, land and water use, and coastal demographics, policy, and management. Efforts can build on the considerable CEOAS ocean observing systems (Ocean Observatories Initiative, Northwest Association of Networked Ocean Observing Systems) and other OSU resources such as the H. J. Andrews Forest Long Term Ecological Research Network.

Natural hazards. A wide range of hazards such as the potential for mega-thrust earthquakes, tsunamis, volcanic eruptions, coastal erosion, wildfires, mountain-related hazards, and climate change are quite specific to the region or have regional characteristics. CEOAS will build on existing regional expertise to pursue studies that better integrate basic scientific understanding of these hazards with development of tools for improved characterization and monitoring, and political and social strategies for mitigation and management.

Natural resources of the earth and ocean. CEOAS will expand current research efforts in energy (hydrocarbon, geothermal, wind, and wave) and mineral resources, with expanded links to human dimensions, sustainability, and climate change impacts.

New technology development. CEOAS will build upon its history of technology development. For example, CEOAS research lead to formation of Western Environmental Technologies Laboratories, Inc. and ZAPS Technologies. New technologies may include ocean, earth, and atmospheric sensor development, application of existing autonomous aerial and underwater vehicles, and use of multi-spectral optical and multi-frequency acoustics on a variety of platforms. New technologies may also include creation of natural products and new software tools (GIS applications, numerical codes, data visualization, etc.).

Planetary research and extreme environments. CEOAS will build on its expertise in planetary (Mars) geology and atmospheres, evolution of the earth, and the subsurface biosphere to expand research in life in extreme environments, including applications to the possibility of extra-terrestrial life.
Teaching and Learning

The CEOAS educational vision is academic excellence and scientific literacy through internationally renowned academic programs that reflect the interdisciplinary expertise of the University. Our mission is the education and training of students to become engaged members of society who can grapple with complex environmental and resource issues. We approach the mission through delivery of academic programs that lead to degrees and certificates of value and through contribution to scientific literacy, in keeping with the OSU educational mission.

Values

CEOAS academic programs, and the excellent faculty and instructors that design and deliver them, provide a balance between breadth and specialization. All CEOAS academic programs have the following values.

- Academic programs that provide solid scientific foundation, breadth, and opportunity for specialization.
- Academic degree and certificate programs with clear expectations and straightforward paths to timely completion.
- Learning outcomes that include subject proficiency and capability in synthesis, critical thinking, and communication.
- Experiential learning through laboratory work, field work, research, internship, and other practical experiences.
- Engagement of tenure-track faculty in undergraduate and graduate education, and mentoring to prepare students for successful lives.
- Strong relationships with alumni.

Where We Excel

The merger of academic units in CEOAS brings together traditions of excellence exemplified below.

Vigorous graduate degree programs enroll nearly 200 students in 7 degree programs, with substantial increases in the number of applications since the merger. The programs attract outstanding students. The students work closely with faculty advisors undertaking cutting edge research. Many contribute to the college's teaching excellence as teaching assistants, themselves gaining important practical experience. Teaching assistant evaluations are consistently high.

Healthy undergraduate degree programs serve nearly 700 undergraduate in two BS programs and are facilitated by an outstanding advising staff. The new Earth Sciences BS degree propagates the excellence in the former undergraduate degrees as transcript-visible options while building on a core that reflects the disciplinary range of the college. The BS degree in Environmental Sciences serves approximately 500 students, including a large and successful on-line degree program.

Deep commitment to experiential learning. Nearly all courses in the college include a lab, a recitation section, or a field trip. All undergraduate degree programs require a substantive field or internship experience; the geology field camp, a rigorous multi-week field class has been offered for nearly eighty years. An experiential learning coordinator is dedicated to assisting undergraduate students to obtain internships and research experiences. The college supports the student Geo Club, which organizes seminars with professionals, social functions, and organizes national and international field trips.

Service teaching for university general education and training is via 1) a large slate of baccalaureate core courses and 2) delivery of certificate programs, particularly the Geographic Information Science undergraduate certificate, which at ~60 students is the largest in the university.

Strong commitment to alumni is fostered through publications, alumni events at conferences and at OSU, and through engagement with the CEOAS Board of Advisors which meets biannually. Alumni of programs in CEOAS have high rates of participation in financial support.
The Way Forward

Excellence in CEOAS academic programs will be furthered by attracting competitive students through recruitment, scholarship opportunities, and delivery of excellent and relevant programs. Our aim is to educate well-rounded students with a range of research skills, teaching skills, and professional skills, including preparation for earning professional credentials. To this end we adopt the following goals.

- Adapt existing programs and develop new programs fitting to the new College, such as an Ocean Sciences option and a Natural Hazards MS or certificate.
- Increase access through non-traditional delivery modes, such as increased remote access to courses and certificates (e.g., distance-education graduate GIScience certificate), and delivery of courses and degrees at other facilities (e.g., OSU Cascades campus, Hatfield Marine Science Center, Mitchell Field Station).
- Enhance and expand faculty involvement with students through mentoring, teaching, and undergraduate research.
- Integrate professional training with academic degree programs, such as more research and internship opportunities, and engage with professionals in the private sector and professional communities.
- Increase diversity and international student enrollment.
- Enhance support for student activities, such as field trips, social activities, and workshops (e.g., through SAC and Geo Club).
- Increase and organize participation in the Honors College, such as through project mentoring and courses.
- Develop and maintain facilities that support educational excellence and use of modern technologies, including laboratories, lab equipment, IT infrastructure, class room space, and office space for advisors and staff.

CEOAS is committed to supporting university goals in science literacy through delivery of courses that provide basic science content and skills and that have application to societal and global issues. To this end, CEOAS will develop and maintain a suite of courses that serve the baccalaureate core and general interest and that align with the staffing and expertise in the College.

CEOAS is committed to maximizing our earth sciences educational footprint in the state by working together with other OSU units to support and expand course offerings and degree programs at the OSU Cascades branch campus and at the Hatfield Marine Science Center (HMSC). Examples of possible programs at OSU Cascades include mountain studies, climate studies, and natural hazards. Examples for HMSC include experiential classes in observational oceanography, and coastal and estuarine oceanography.
Outreach and Engagement

Outreach and engagement is the public face of CEOAS, but it goes beyond this. We reach out to and work with the general public, communities, government, groups, industries, policy- and decision-makers at all levels, prospective students, alumni, and potential benefactors. Our goals are to make CEOAS science, scientists, educators, and learners accessible, to share discovery, collaborative learning and problem solving, and to unite scientific and experiential knowledge to sustainably use and conserve the planet. We endeavor to communicate what CEOAS is, the range of CEOAS expertise, and how CEOAS research benefits the world.

Outreach and engagement is woven into the fabric of the College and this element of our vision provides the public and policy worlds with essential information for both business and moral perspectives. The primary activities of the College are research and education, and we recognize that outreach and engagement integrate naturally with these primary activities. We strive to connect with many partners from the technical, practical, ethical and inspirational perspectives.

Values

As a part of a Land, Sea, Space and Sun Grant university, CEOAS faculty, staff and students hold true the following values for outreach and engagement:

- Leadership, partnership, and service to scientific, education, management, and practice communities.
- Effective communication, cooperation, and integrity in research, teaching, and service.
- Cultivating, establishing, and maintaining partnerships that advance understanding, learning, management, and practice within the context of the earth, ocean, and atmospheric sciences.

Where We Excel

CEOAS shares and builds on its strengths when it partners with other scientists and educators in schools, community colleges, universities, state and federal agencies, museums, Native American governments, NGOs (non-governmental organizations), and industry and community groups. These partnerships provide connections, inputs, and feedbacks beyond those available within CEOAS or OSU. It will be our mutual interests and resources that allow us to collaboratively learn, problem solve, and plan/prepare for the future.

The thirst for and fascination with earth, ocean, and atmospheric science by students and the public is a source of support for CEOAS and we are committed to working partnerships that discover, learn, and serve. Our leadership in community educational events like Marine Science Day in Newport and daVinci Days in Corvallis is an example of shared learning and a celebration of our partnerships.

CEOAS is committed to sharing our science, adopting an Open Access policy in February of 2010 and encouraging implementation among faculty members.

CEOAS partners include the following:

- K–12 schools, community colleges, universities, and centers for continuing education.
- Resource and policy managers in coastal communities, state and federal agencies.
- Outreach partners at museums, Sea Grant and OSU parallel activities.
- Industries with interest in CEOAS environment and technology capabilities.
- Native American groups.
- Non-governmental organizations (NGOs).
- Hatfield Marine Science Center.
The Way Forward

The capabilities and knowledge in CEOAS bear on many national, state, and local environmental and management problems. We will continue to deliver the remarkable science that occurs within CEOAS to groups outside the College. Because of our skills and geographic location, and regional opportunities, we plan the following.

- Continue our national science leadership positions with funding agencies and service on national advisory panels to provide sound and timely advice on issues like the consequences of climate change, marine-based hazards, and space/resource planning for the conservation and sustainable use of the sea and its resources.
- Develop efficient and intentional delivery strategies of CEOAS-based research and education (public and group events, accessible web-based and social media presences, Open Access research publications in OSU ScholarsArchive, etc.).
- Coordinate CEOAS outreach and engagement activities by integrating and aligning existing College activities, including those of the CEOAS Publications Office, development officers and those involved in education beyond our walls.
- Foster more connections with the private sector and explore opportunities to enhance research and establish research sponsorships, undergraduate and graduate internships, adjunct professorships, guest lectures and seminars, employment, and development opportunities.
- Foster cooperation and coordination with educators at many levels in the delivery of current earth, ocean and atmospheric science content. Expand opportunity for earth, ocean, and atmospheric science education in nearby schools and community colleges.
- Provide training for faculty and students in how best to communicate science in a variety of situations and to a variety of audiences. This includes, but is not limited to, engaging communities of place and interest in our research, working within the policy and management arenas, and using traditional and social media.
- Reach beyond Corvallis by considering all travel by faculty, staff and students as an opportunity to project the CEOAS image.

Facilities

CEOAS is committed to maintaining an infrastructure that provides scientists, teachers, and students the tools required to continue research and education activities at the cutting edge. The state-of-the-art facilities at CEOAS support field observations of the earth, ocean, and atmosphere; sophisticated laboratory analyses; and advanced computer modeling of earth, ocean, and atmospheric processes. In addition, CEOAS maintains archival facilities that are recognized and utilized by scientists around the world.

We are also committed to our undergraduate and graduate academic degree programs that educate future scientists, resource managers, and environmental policy makers. Success in this endeavor requires maintaining state-of-the-art classrooms and teaching laboratories; facilities for experiential and in-the-field training; and up-to-date computational resources and telecommunications equipment required for distance learning courses.

CEOAS is also committed to outreach and engagement with the public, maintaining exhibits and other material that provide the public with opportunities for free-choice learning about our planet.

CEOAS currently maintains a set of outstanding facilities that contribute to its thriving academic and research environment and make the College exceptional among its peers. In addition to on-campus office, laboratory, and classroom space, College facilities include those on the next several pages.
Values

• Infrastructure for cutting-edge research
• Talented technical staff to support research and educational facilities
• World-class archival facilities
• State-of-the-art classrooms and teaching laboratories
• Ever-improving information technology infrastructure to support research and teaching
• Resources for significant outreach and engagement

Where We Excel

• The 175-foot Research Vessel Oceanus and the 54-foot Research Vessel Elakha operated by CEOAS Ship Operations through a port office, a 550-foot dock, and associated ocean-going support based in Newport, Oregon.
• The CEOAS Environmental Computing Center, a 3700 square-foot climate-controlled facility with generator power backup for high-performance computing and telecommunications gear.
• The Ocean Observing Center, a 12,500 square-foot, custom-designed building located on the south end of Corvallis with laboratory, high bay staging, and office space, primarily in support of the National Science Foundation's Ocean Observatories Initiative (OOI).
• Research laboratories, sediment core archives, and field work staging facilities near the edge of campus (30th Street and Western Avenue).
• Teaching infrastructure of classrooms, computer laboratories, demonstration equipment (such as a rotating tank), and educational collections, located in Burt, Wilkinson, and Strand Agriculture halls.
• Hatfield Marine Science Center laboratories and facilities located in Newport, Oregon, used by CEOAS faculty and students, fostering collaborations between CEOAS and state and federal agencies.
• Field facilities for education and research, including a field camp in Mitchell, Oregon, used to teach summer geology classes, and the H. J. Andrews Forest research station.
• A large number of laboratory, analytical and other facilities operated by individual faculty or research groups (see sidebar). Many are widely used by researchers across campus, nationally, and internationally.

CEOAS Facilities

• Active Tectonics and Seafloor Mapping Laboratory
• Coastal Imaging Laboratory
• Coring Facility
• Electron Microprobe Laboratory
• Experimental Petrology Laboratory
• Micropaleontology Laboratory
• OSU / CEOAS Stable Isotope Mass Spectrometer Facility
• OSU / CEOAS Marine Geology Sample Repository
• W.M. Keck Collaboratory for Plasma Spectrometry
• 40Ar/39Ar Geochronology Laboratory
• Global seismic station COR, established in 1950
- Seismic Imaging
- National Geoelectromagnetic Facility
- Terra Cognita Lab
- Cartography and Geovisualization Lab
- Glacial Geology Lab
- Hydrogeology Lab
- Ice Core Gas Lab
- Oxygen Extraction Lab
- X-ray Diffraction Lab with Portable X-Ray Fluorescence Analyzer and Portable Infrared Mineral Analyzer
- Taubenek Microscopy Lab
- Ocean Currents Mapping Lab
- Moderate Resolution Imaging Spectroradiometer (MODIS) Direct Broadcast Satellite Receiving Station
- Rock preparation labs (cutting, grinding, polishing, mineral separations)
Alumni relations, charitable giving, and endowment building are distinct forms of outreach and engagement. Besides extending the reach of CEOAS, charitable giving contributes directly to CEOAS research, teaching, and service missions. We recognize that the potential impact of successful fundraising is significant and can be enhanced if embraced by the College as a whole and conducted strategically.

CEOAS seeks to actively engage its alumni through regular updates about CEOAS activities, active involvement of a CEOAS Board of Advisors and the CEOAS Friends Board, and building long-lasting relationships with undergraduate students while they are enrolled in CEOAS. CEOAS faculty, staff, and students participate in fundraising opportunities through the OSU Foundation (OSUF), most recently as part of the Campaign for OSU.

Future fundraising strategies include the following.

- Merge plans of Geosciences and COAS and update to create a CEOAS fundraising plan.
- Work with OSUF, the Dean and Associate Deans, and a faculty committee to draft a five-year fundraising plan.
- Update the concept for a research, teaching and learning center as a new building (see Facilities section) and identify strategies for raising funds for its construction.
- Engage each discipline group to get input on fundraising priorities.
- Refine the kinds of Board(s) and Board membership to best serve College objectives.
- Plan new and continue ongoing alumni events such as gatherings at national meetings (e.g., Friends of the Beaver at the Fall American Geophysical Union meeting), field camp reunions, extended field excursions, etc. Work with OSUF to align CEOAS priorities with those of the Foundation and elevate CEOAS needs on the present and future Campaigns for OSU.

The Way Forward

Recognizing the critical role that facilities play in supporting the CEOAS research, education, and outreach and engagement missions, several key areas require attention in order to carry out the strategies outlined for each of these areas.

- Build a new building for research, education, and public outreach in earth, ocean, and atmospheric sciences. The College is currently short on space, based on research and education needs, a shortage acknowledged by the University. Building on previous efforts including updating an existing detailed building design, we will develop a funding strategy for a new building to accommodate our growing need for advanced laboratory space and teaching facilities. This building would also house a new outreach center and museum that will highlight the research of the College and be a gathering place for public engagement and free-choice learning about the earth.
- Secure a new sea-going research vessel. In 2013, the National Science Foundation awarded CEOAS with a grant to help design and build a new class of Regional Class Research Vessels. With continued OSU and State of Oregon support, the goal is to have one of the new vessels replace the R/V Oceanus and be operated by CEOAS Ship Operations in Newport, Oregon. At the same time that a new large research vessel will be pursued, the concept of bringing a range of small to medium research vessels under CEOAS Ship Operations will be developed in order to match needs for coastal ocean and estuarine research and education.
- Create, update, and increase technical support for on-campus teaching facilities, including electronic classrooms, teaching labs, and improved connectivity to the Hatfield Marine Science Center and OSU Cascades campus.
- Secure a new archive, staging, and warehouse facility, in particular to house large sediment and ice archives, room for sample preparation and processing, and to facilitate CEOAS field research.
- Increase support for CEOAS faculty research space at the Hatfield Marine Science Center.
- Maintain CEOAS, OSU, and federal support for state-of-the-art analytical facilities. Examples of desirable new facilities include advanced laser-based sensors for environmental isotope research, advanced mass spectrometers for environmental isotope research, and thermal ionization mass spectrometry for surface and solid earth research.
- Merge computing structure between former COAS and Geosciences, balancing the needs of individual research groups who typically manage their own powerful compute servers, and broad College-wide needs for networking, instructional needs, support for OSU-required software applications (e.g., Cayuse proposal system, GRBS grant reporting), and centralized backup for basic services such as email.

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Measuring Success

Research and Discovery

- Sustain publication of peer-reviewed journal articles and scholarly books.
- Increase participation of undergraduate students in CEOAS research activities.
- Lead national and international research and facilities programs.
- Deliver keynote addresses at national and international meetings.
- Promote membership on national and international scientific committees.
- Create a 'one stop shop' for CEOAS access to a broad range of research vessels.
- Pursue a diversity of funding sources, including private and foundation support for research.

Education

- Increase successful recruitment of excellent graduate and undergraduate students
- Improve recruitment and support of graduate students through college-wide strategic distribution of teaching assistantships.
- Double the number and total dollar amount of undergraduate student scholarships.
- Foster substantive and practical experiential learning in CEOAS undergraduate degree programs.
- Increase diversity and international student enrollment.
- Develop Ocean Sciences undergraduate degree and certificate option.
- Develop degree and certificate programs in Natural Hazards and in Integrated Water Resources Management.
- Develop online undergraduate certification in GIScience.
- Build strong relationships with private sector.

Outreach and Engagement

- Encourage utilization of CEOAS data and knowledge by governments, Non-Governmental Organizations, and industry.
- Create and maintain an interactive, up-to-date CEOAS web page regularly accessed by faculty, staff, students, our colleagues and the public.
- Increase participation in local K-12 schools and community colleges.
- Continue to emphasize electronic open access to scientific publications.
- Elevate CEOAS presence on the OSU Foundation priorities for fundraising.
- Provide communication training opportunities for all CEOAS faculty.
- Develop displays and exhibits for use in CEOAS buildings, nearby public spaces and across Oregon including, for example, Portland, Newport and Bend.
- Update OSU Ship activity display at HMSC Visitor Center to include Oceanus and Elakha research vessels, and plans for the Regional Class Research Vessel.

Facilities

- Develop and initiate a funding strategy for a new CEOAS building.
- Design and construct new CEOAS building by 2018.
- Fully integrate the CEOAS computer network, seamlessly linking former COAS and Geosciences, in 2014.
- Finalize design for NSF approval of Regional Class Research Vessel in 2014.
- Add at least one electronic classroom by 2014.
- Design, build, and occupy new archival space by 2015.
College of Earth, Ocean, and Atmospheric Sciences

Strategic Plan
For the years 2013–2018

http://ceoas.oregonstate.edu
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