

OREGON STATE UNIVERSITY

2011 Federal Priorities

Oregon State
UNIVERSITY

Message from the President

I am pleased to report that during the past year Oregon State University maintained — and in many areas enhanced — its ability to deliver quality, affordable education to Oregonians and research innovation and leadership to communities, businesses and industries in Oregon — and the nation. Our progress is especially gratifying given the continuing economic challenges we all face, particularly our students and their families.

OSU reached an enrollment of more than 23,700 students this year — a new record. In 2009-10, more than 2,500 Oregonians attended OSU with the cost of all tuition and fees provided through the Bridge to Success program. This program, which combines federal Pell Grants, state-funded Oregon Opportunity Grants and university-funded tuition assistance, opens the door to higher education for deserving, financially needy students. Thanks to your efforts, we were able to provide Pell Grants to 5,789 OSU students, a total of \$22,731,404 in assistance.

OSU's faculty continue to be extraordinarily productive as researchers, securing \$275 million in research grants and contract awards last year. This is a \$23 million increase over the previous year. Of the total, nearly \$185 million — 67 percent — was federally funded. This research — and our emphasis on discovery and innovation as a source of new products and businesses — has paid off in a number of areas, including substantial venture funding for several OSU spinoff companies, including Home Dialysis Plus and Azuray Technologies.

I am equally proud of OSU's rapidly growing role in leading significant federal research initiatives in climate science, where OSU scientists head programs for NOAA, USDA and the U.S. Geological Survey; in examining land management issues for the U.S. Forest Service; in Superfund Basic Research for the EPA; and in many other areas of regional and national importance.

On behalf of the entire OSU community and our many stakeholders, I look forward to working with you to promote the health, prosperity and success of Oregon and the nation. Thank you for your service and your support.

Sincerely,



Edward J. Ray
President, Oregon State University





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Kelly Benoit-Bird studies ocean organisms smaller than a microchip and bigger than a motor home — the tiniest crustaceans to the mightiest cetaceans — just about anything that swims or drifts in the sea. As a pelagic (open ocean) ecologist, Benoit-Bird investigates the intricate interactions among predators and prey in Earth's vast oceans.

The challenge is almost beyond imagining. Within 326 million cubic miles of seawater, most species interactions happen where humans cannot witness them. Besides, as Benoit-Bird points out, the marine environment is in constant motion. Forests may be complex ecosystems, but at least they stay put. At sea, plants drift on tides and currents, rising and falling in the water.

To compensate, Benoit-Bird extends her senses. She devises novel acoustic and optical technologies that collect data remotely, opening the world's oceans to human understanding in ways never before possible. In 2010, the John D. and Catherine T. MacArthur Foundation recognized her pioneering work with a prestigious \$500,000 MacArthur Fellowship — popularly known as a “Genius Award.”

Instead of being like a big pot of soup with its ingredients evenly mixed, the ocean is more like a big blue torte with dense congregations of organisms layered vertically. In coastal waters, plankton coalesce into layers two or three feet thick, sometimes extending for miles horizontally. These “thin layers” of tiny life forms — which Benoit-Bird calls “great smorgasbords of food” — likely hold critical clues to how ocean ecosystems work.

“Thin layers are likely to be important for a variety of biological processes, including growth rates, reproductive success, grazing, predator-prey encounters, nutrient uptake and cycling rates, as well as toxin production,” Benoit-Bird writes in a recent issue of *Continental Shelf Research*.

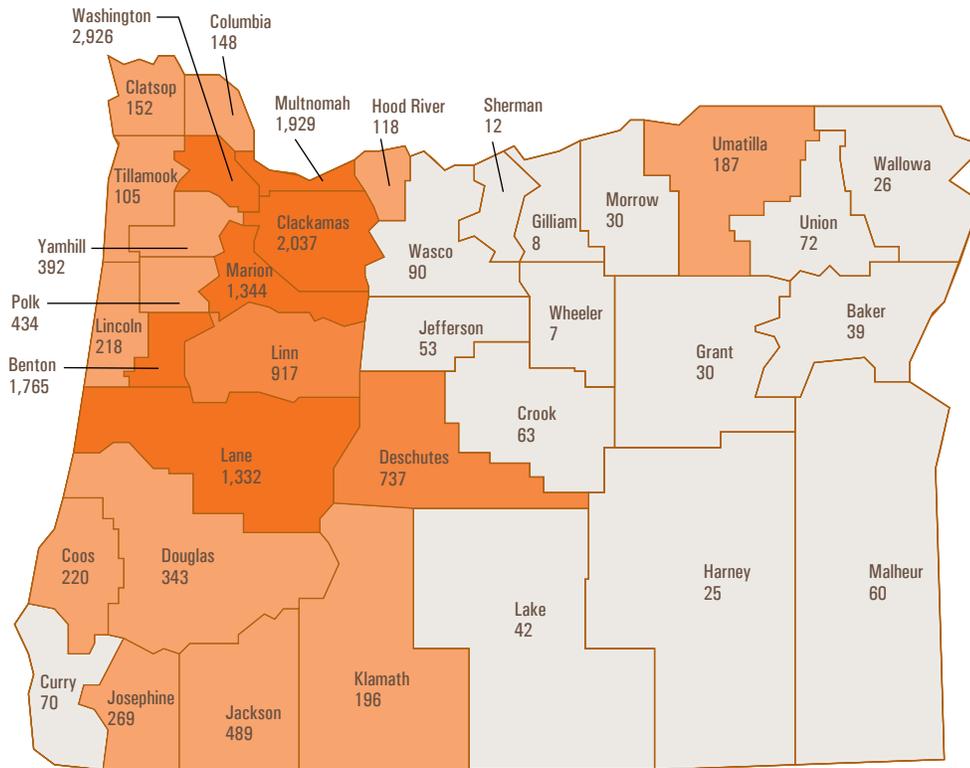
To get inside those mysteries, Benoit-Bird has developed a new generation of tools supported by funding from the National Science Foundation and the DOD Office of Naval Research. She and her collaborators have experimented with video cameras and echosounders and retrofitted a remotely operated vehicle to track plankton layers. And they've invented a new kind of sonar to study the distribution of individual zooplankton inside thin layers.

Genius of the Sea

OSU Student Profile – Enrollment

OSU’s more than 23,700 students come from every county in Oregon, all 50 states and nearly 100 countries. This includes more than 19,500 undergraduates and more than 4,200 graduate and professional students. OSU consistently enrolls more full-time resident students than any other OUS institution. In Fall 2010, OSU enrolled 14,250 full-time resident students, as compared to 13,306 at PSU and 12,039 at UO.

OSU Undergraduate and Graduate Student Enrollment by Oregon County* – Fall 2010



OSU Fall Term 2010 Enrollment by Academic College** and Student Level

Academic Unit	College of Agricultural Sciences	College of Business	College of Education	College of Engineering	College of Forestry	College of Health and Human Sciences	College of Liberal Arts	College of Oceanic and Atmospheric Sciences	College of Pharmacy	College of Science	College of Veterinary Medicine	Graduate School	University Exploratory Studies Program	Total
Undergraduate	1,449	2,312	27	4,116	773	3,120	3,446			3,308			1,008	19,559
Graduate	249	136	348	820	141	259	161	112	25	585	7	775		3,618
First Professional									367		217			584
Total	1,698	2,448	375	4,936	914	3,379	3,607	112	392	3,893	224	775	1,008	23,761

*Best estimation of assignment by county; does not reflect all Oregon resident students.

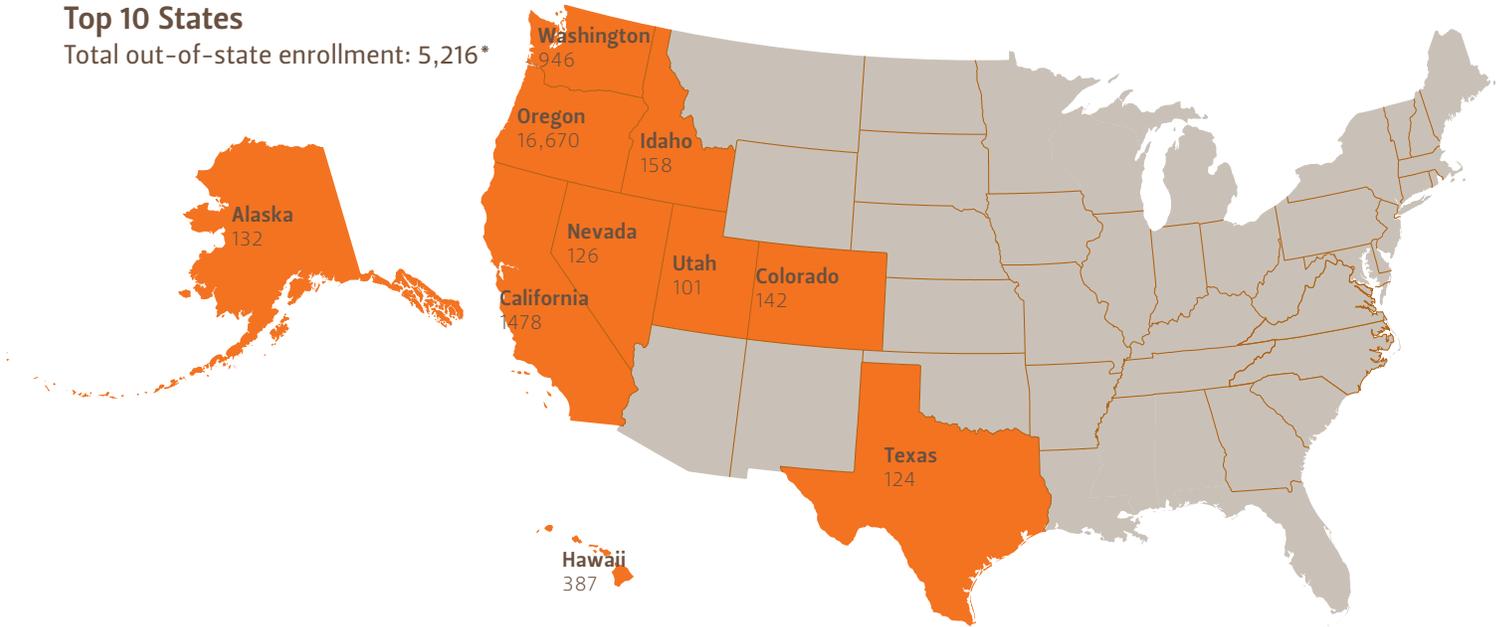
**Unduplicated headcount based upon student’s primary college.

Source: Enrollment Summary Fall Term 2010, Office of Academic Planning and Assessment, Oregon State University, November 2010.

OSU Fall Term 2010 Enrollment

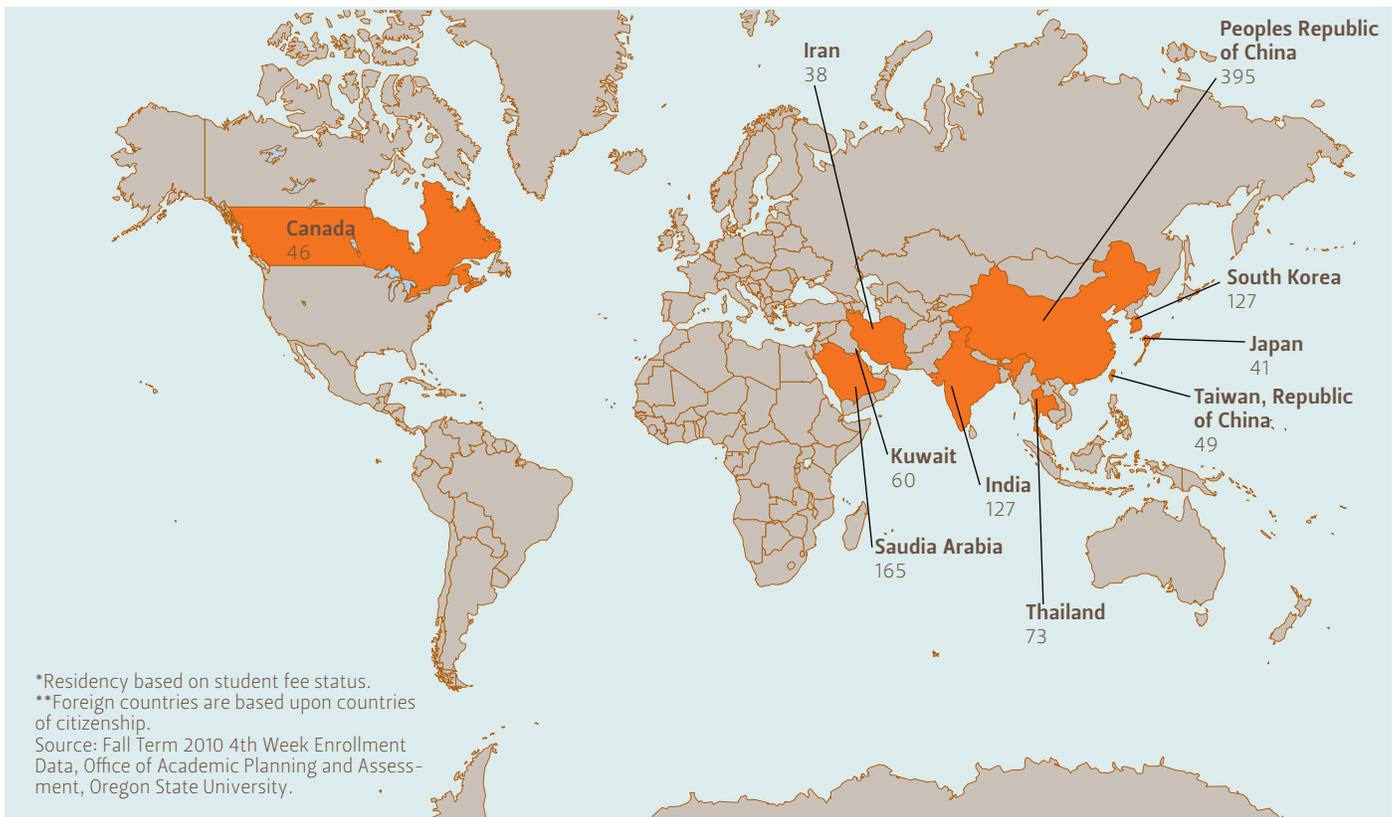
Top 10 States

Total out-of-state enrollment: 5,216*



Top 10 Foreign Countries**

Total international student enrollment: 1,548*



OSU is making significant efforts to increase its international enrollment. Currently, there are 1,548 international students from nearly 100 countries, comprising 6.5 percent of the student body. By 2015, OSU hopes to increase its international enrollment to 10 percent. Initiatives like INTO Oregon State University (INTO OSU), a collaboration between OSU and INTO University Partnerships, a United Kingdom-based firm specializing in recruiting international students, support OSU's efforts to internationalize its campus and enrich the global perspectives of all students.

2009-10 Federal and State Student Aid at OSU:

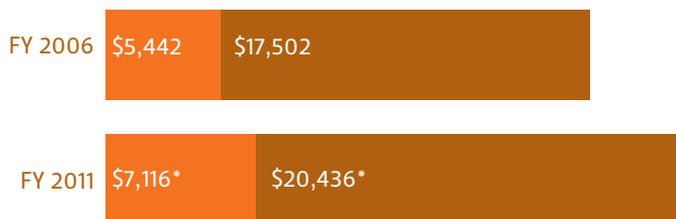
• 5,789 students received Pell Grants	\$22,731,404
• 3,288 students received Oregon Opportunity Grants	\$6,292,665
• 768 students were employed under the Federal Work-Study Program	\$929,838
• 947 students received Federal Supplemental Education Opportunity Grants	\$1,050,695
• 1,615 students received Perkins Loans	\$3,167,563
• 18,668 students received Federal Ford Direct Loans	\$91,076,323

47 percent of OSU undergraduate and graduate students received need-based federal financial aid in the 2009-10 school year.

	Pell Grant Recipients	Total Pell Grant Payments	% of Tuition Fees* (Undergraduate Residents) Covered by Maximum Pell Grant
2005-06	4,449	\$11,487,130	75%
2009-10	5,789	\$22,731,404	80%

Tuition and Fees Per Student

Undergraduate



Graduate



* Oregon University System Academic Year Fee Book 2010-11. Assume 15 credit hours. All majors except Business and Engineering which have higher differential tuition.

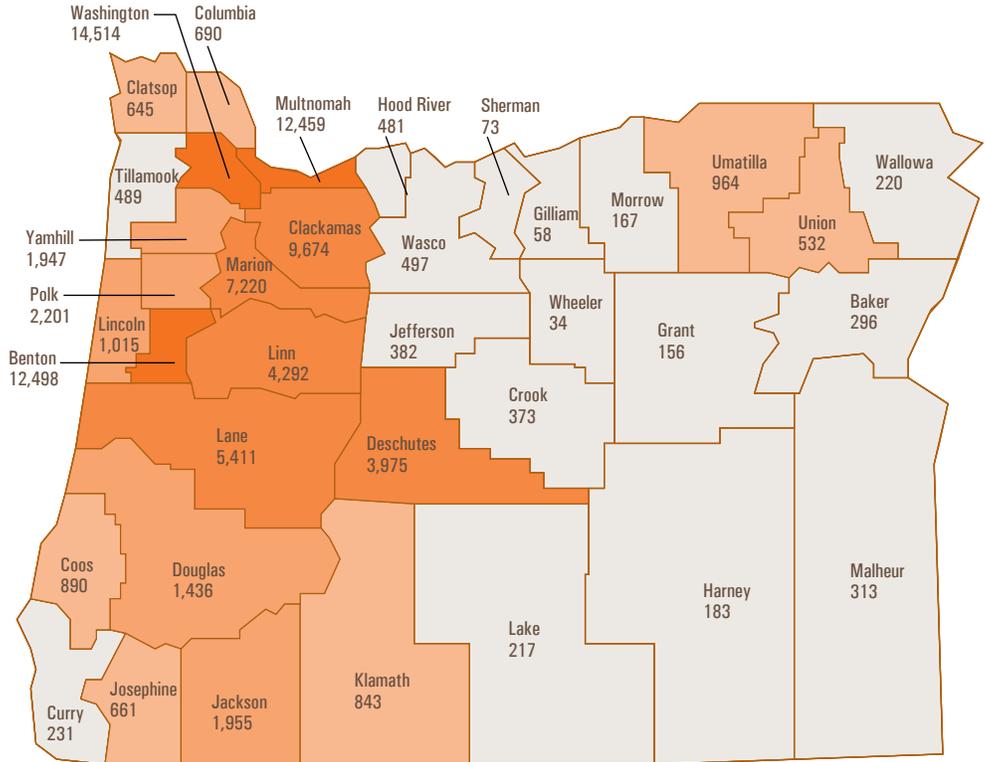
** Oregon University System Academic Year Fee Book 2010-11. Assume 12 credit hours. All majors except Business Engineering and Master of Public Health which have higher differential tuition.



OSU Across Oregon

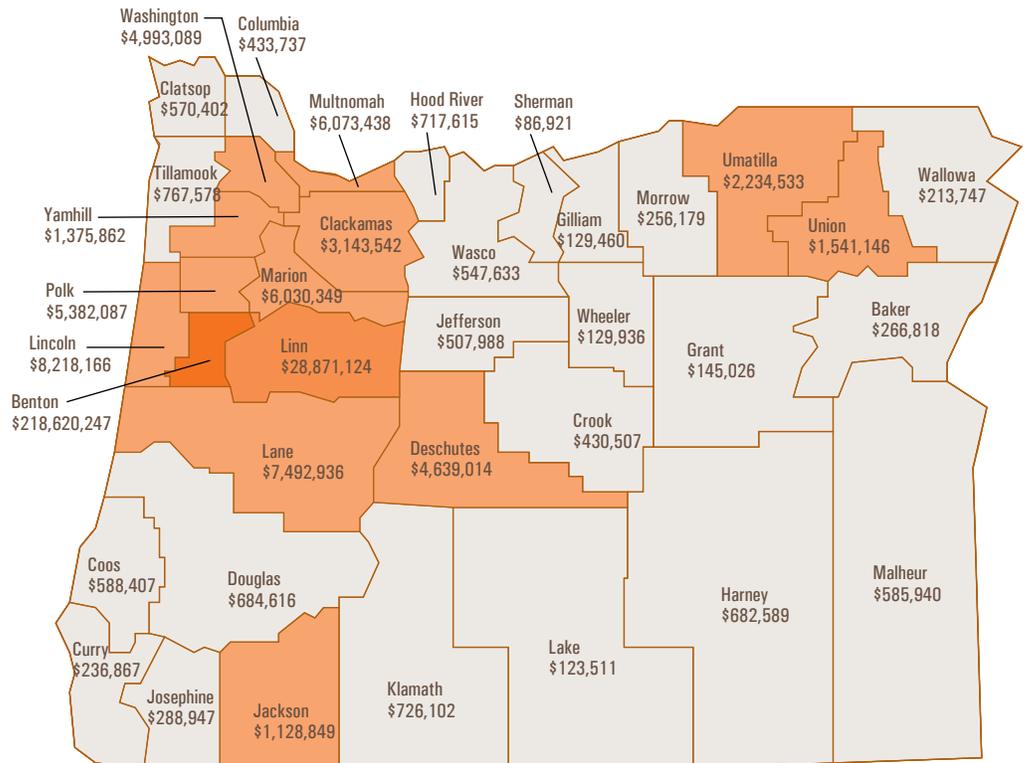
OSU Alumni Count by County 2010

Total Alumni from Oregon: 87,992



Source: Active Alumni Demographic Data report, OSU Foundation, December 2010.

OSU Payroll by County Calendar Year 2010

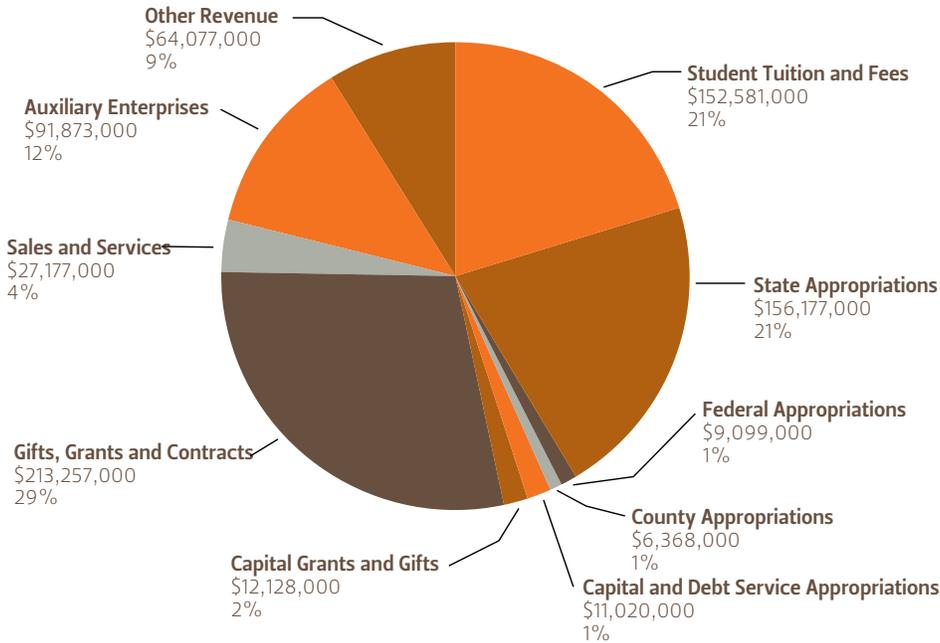


Source: OSU Office of Human Resources Includes all paid OSU faculty and staff, student employees and graduate assistants. Does not include OSU Foundation or OSU Alumni Association employees.

OSU Financial Profile

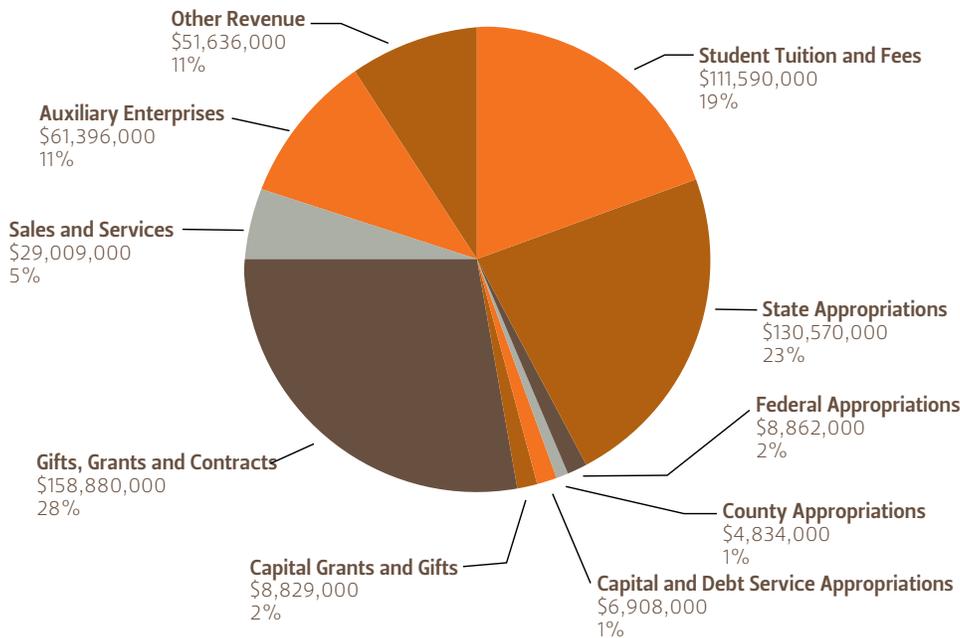
Source of Funds – FY 2010

Total: \$743,757,000



Source of Funds – FY 2005

Total: \$572,514,000



Source: Oregon University System Audited Financial Statements. Using FY05 numbers restated for comparison to FY10 presentation.

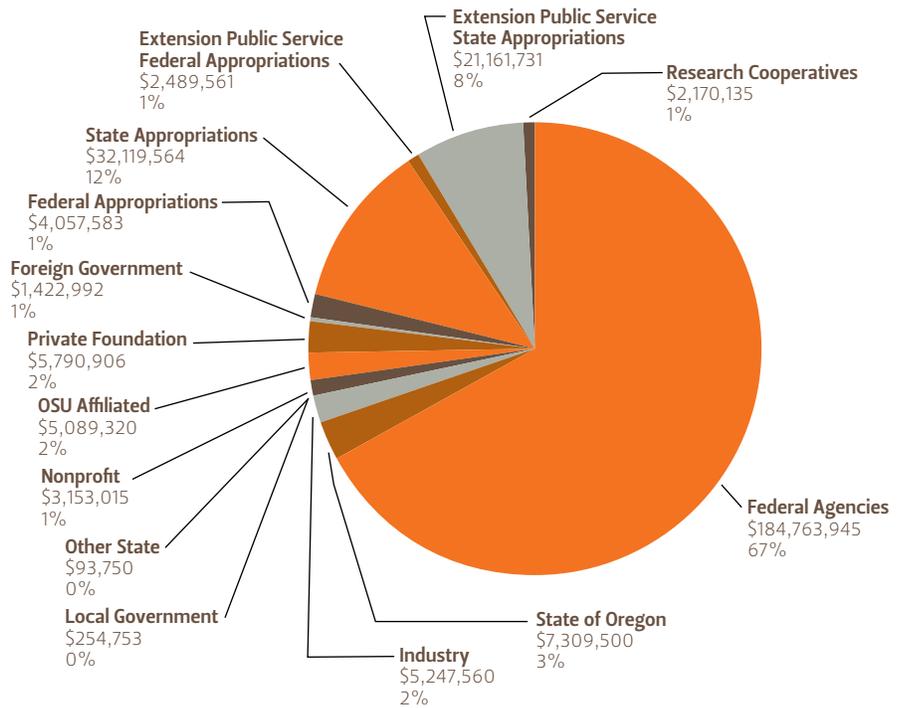


Research at OSU

Oregon State University scientists earned more than \$275 million in research contracts and grants in 2009-10, including more than \$184 million in federal agency awards. During the same year, licensing income from technology transfer efforts brought in \$2.67 million, 22 new patent applications were made, and 52 new invention disclosures were filed. OSU is ranked in the Carnegie Foundation's top tier for "very high research activity" and is one of only two research universities in America to hold the federal land, sea, space and sun grant designations simultaneously. OSU is Oregon's largest public research university, receiving more than 49 percent of the total federal research funding in the Oregon University System (see graph on page 9).

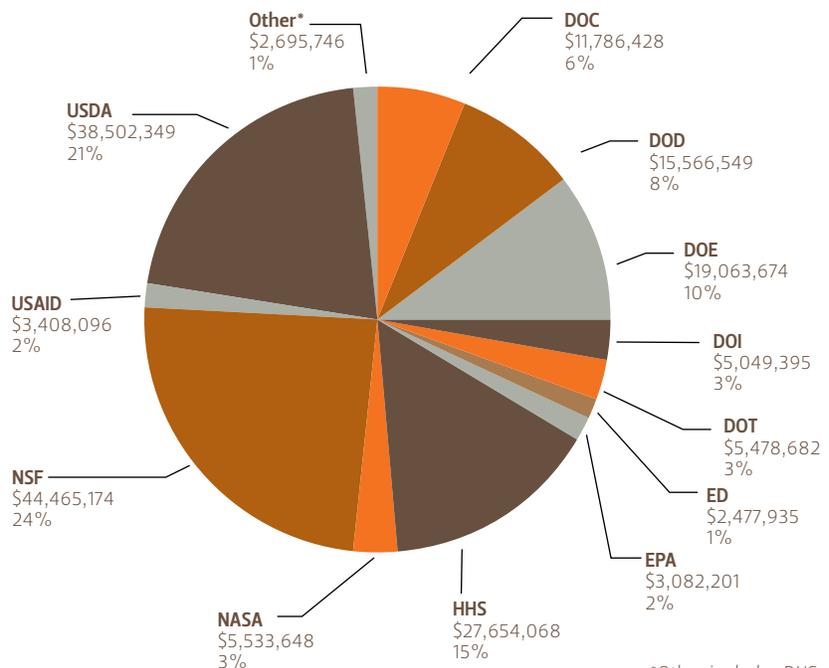
OSU Externally Funded Awards FY 2009-2010

Total: \$275,124,315



OSU Federal Agency Awards – FY 2009-2010

Total Federal Agency Awards: \$184,763,945

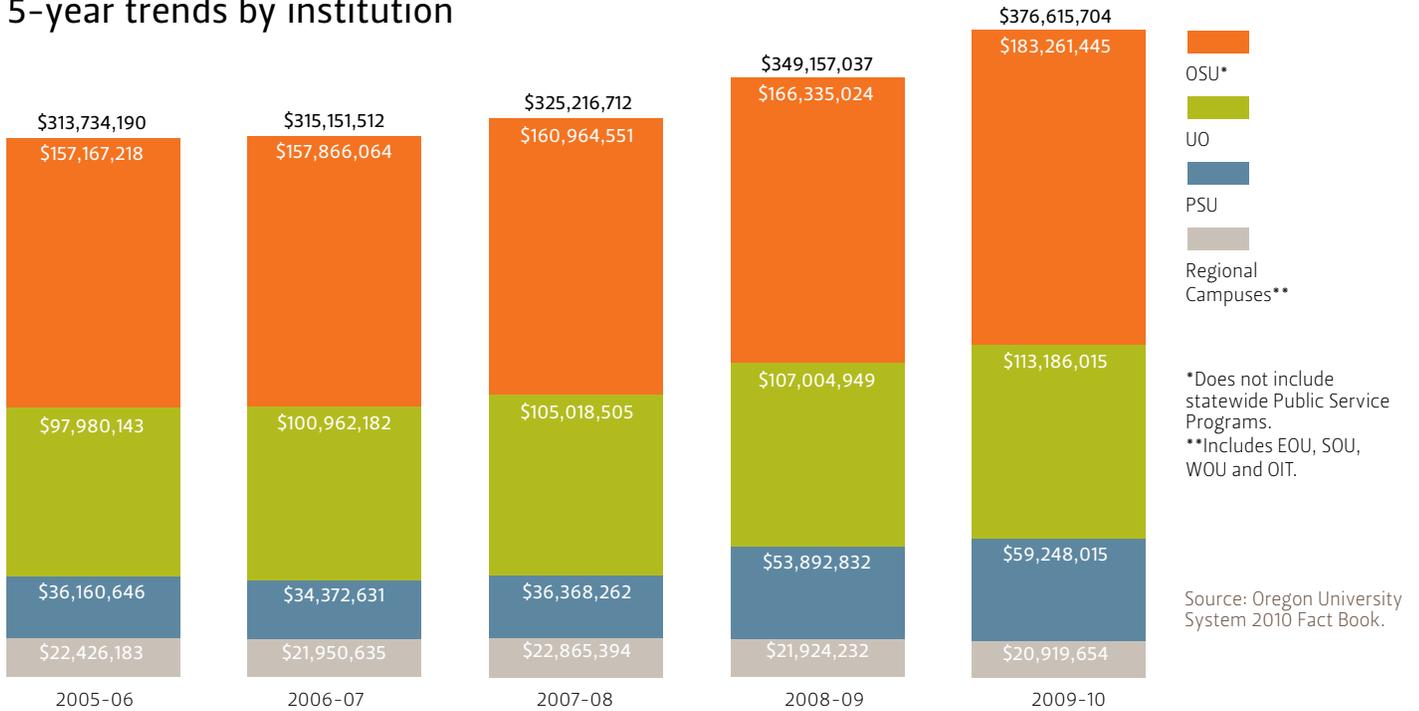


*Other includes DHS, NRC, OPM and State.

Source: Proposal and Award Statistics, OSU Research Office; OSU Office for Commercialization and Corporate Development.

Oregon University System Federal Research Dollars Awarded

5-year trends by institution



OSU's contribution in federal research dollars awarded is consistently around 50% of the OUS total.

Spinoffs Boost Oregon's Economy

Despite the lingering economic slump, OSU spinoffs in portable kidney dialysis, solar energy and other cutting-edge technologies are generating jobs and dollars in Oregon. Last fiscal year, OSU spinoffs created 90 jobs and generated \$2.67 million in revenue for the university, the Portland Business Journal reported in August.

Venture capital firms have also been bullish on OSU-originated firms. Home Dialysis Plus and Azuray Technologies, for example, received investments of \$55 million during the first half of 2010 alone.

Since 1982, Oregon State has spun out 23 companies. Four or five more startups are in the pipeline for the coming year, says Brian Wall, director of OSU's Office for Commercialization and Corporate Development.

"We're at a point where we're analyzing the technology to be sure it doesn't need significant R&D investment," Wall told Business Journal Web editor Suzanne Stevens. "Then we'll help make introductions to potential investors and CEOs."



Product Lines

These 12 biotechnology, energy and computer software companies account for about 300 jobs and \$100 million in investment. They have spun off directly from or leveraged relationships with Oregon State University research.

Life Microsystems

Chlorophyll and bio-compounds
Corvallis, Oregon

Inpria

Printed electronics
Corvallis, Oregon

Fizzy Fruit

Carbonated strawberries and grapes
Portland, Oregon

Strands

Personal recommendation software
Corvallis, Oregon

Redrover Software

Spreadsheet quality control
Corvallis, Oregon

Azuray Technologies

Semiconductors for solar energy
Tualatin, Oregon

Columbia Power Technologies

Ocean wave energy
Corvallis, Oregon

Accessible Information Management

Services for persons with disabilities
Corvallis, Oregon

Clear Shape Technologies

Design-for-manufacture technologies
Santa Clara, California

Precision Plant Systems

Optimized agricultural production
Corvallis, Oregon

Smart Desktop

Desktop usability recognition
Seattle, Washington

NuScale Power

Nuclear energy
Corvallis, Oregon

Other technology companies working with OSU:

Apex Drive Laboratories

Electric motor technologies
Portland, Oregon

CSD Nano

Thin-film technologies
Corvallis, Oregon

Home Dialysis Plus

Portable kidney dialysis
Corvallis and Portland, Oregon

Mtek Energy Solutions

Microchannel reactors for biodiesel
Corvallis, Oregon

Nanobits

Nanotechnologies
Corvallis, Oregon

NWUAV Propulsion Systems

Engines for unmanned vehicles
McMinnville, Oregon

Peregrin Power

Electronics for extreme environments
Wilsonville, Oregon

Ruminant Solutions

Microbial products
Albuquerque, New Mexico

Transdigita

Internet connectivity services
Corvallis, Oregon

Trillium Fiberfuels

Wheat or grass straw for ethanol
Corvallis, Oregon

Xtreme Energetics

Solar energy
Livermore, California

Source: OSU Office for Commercialization and Corporate Development.

OSU: Oregon's Land Grant University

This year the U.S. celebrates its strong land-grant tradition with the 150th anniversary of the passage of the Morrill Land-Grant Act.

Hatch Act: The Hatch Act of 1887 established a sustainable federal funding stream for state agricultural experiment stations. The Hatch Act authorized direct payment of federal grant funds to each state to establish agricultural experiment stations under the direction of each state's land grant college. These funds provide each state with basic infrastructure, scientific expertise and facilities for conducting research. Hatch Act FY10 funding was \$3,320,314 for OSU and \$215,000,000 nationwide.

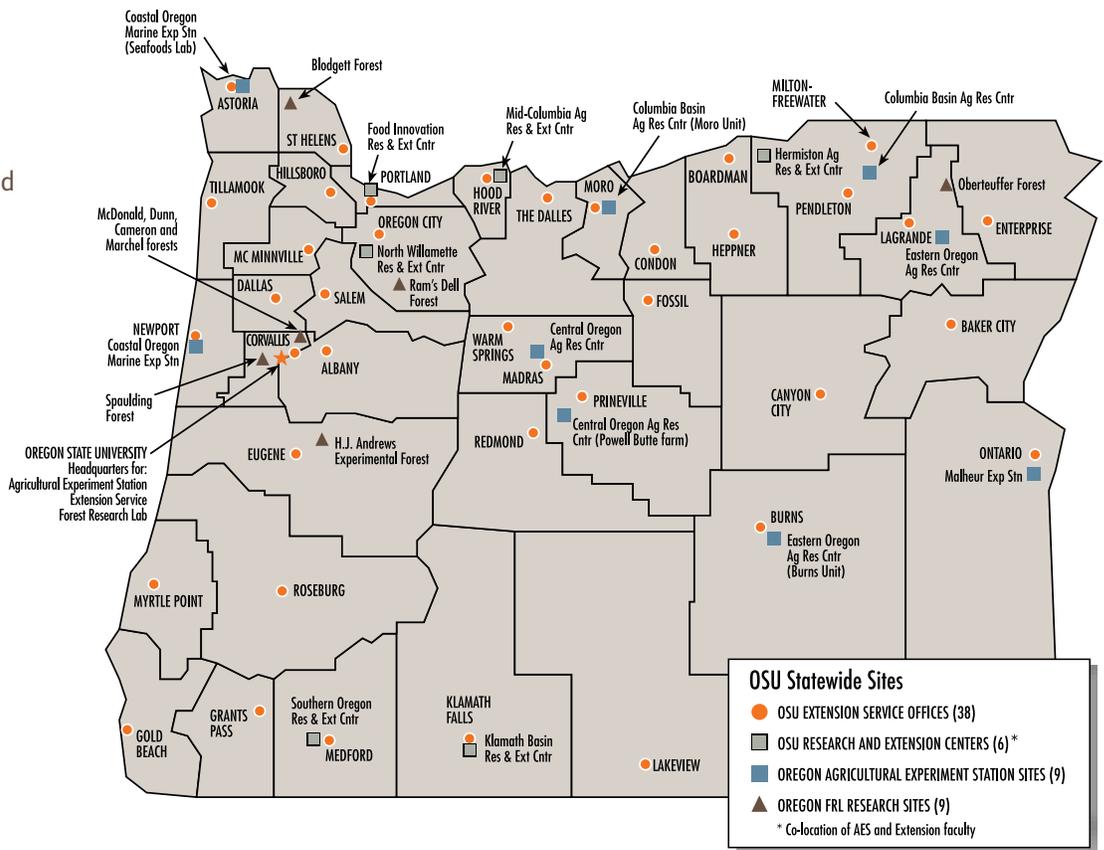
Hatch, Smith-Lever and McIntire-Stennis Act funds are all distributed according to a statutory formula to each of the 50 states. A dollar-for-dollar match is required from the states, but many jurisdictions provide a greater amount.

Smith-Lever Act: The Smith-Lever Act of 1915 established a stable federal funding stream for cooperative extension programs. Current extension education programs are creating social, economic and environmental benefits. Extension programs contribute to economic growth; sustainable agricultural, forestry and marine production methods; improved health and wellness of limited-income populations; positive rural development; and disaster management. OSU manages more than 40 extension offices in every Oregon county. More than 300 faculty members work on extension programs, responding to the diverse needs of Oregonians. Smith-Lever Act FY10 funding was \$4,595,142 for OSU and \$297,500,000 nationwide.

McIntire-Stennis Act: The McIntire-Stennis Act of 1962 provides ongoing federal funds in a federal-state partnership to support university-level forestry research. Research efforts of faculty and graduate students have focused on sustainable, healthy forests that provide economic, social and ecosystem benefits to the state, region and nation. The scientific results and management technologies developed from a variety of research activities are delivered to policy makers, forest managers, forest land owners and other scientists. McIntire-Stennis Act FY10 funding was \$919,846 for OSU and \$27,389,740 nationwide.

Statewide Public Service Programs

OSU Extension offices and Experiment Stations by Oregon County



Policy Priorities and Ongoing National Programs

OSU is one of only two U.S. universities designated as a federal land, sea, space and sun grant institution.

U.S. Department of Agriculture (USDA)

It is critical that USDA maintains a robust agricultural research enterprise which is fundamental to the health of the nation. Universities are an essential part of agricultural research conducted in the United States.

Key USDA programs and institutes include:

- National Institute for Food and Agriculture (NIFA)
- Hatch Act Agricultural Formula Funds
- Smith-Lever Act Extension Formula Funds
- McIntire-Stennis Act Cooperative Forestry Formula Funds
- Specialty Crops Research Initiative
- Agriculture and Food Research Initiative (AFRI)
- Expanded Food & Nutrition Education Program (EFNEP)
- Renewable Resources Extension Act (RREA)
- Animal Health and Disease Research
- Regional Pest Management Center
- Agricultural Research Service (ARS)

OSU researchers secured over \$38 million in competitive grants from the USDA last year.

National Science Foundation (NSF)

OSU researchers secured over \$44 million in competitive grants from the NSF last year.

National Oceanic and Atmospheric Administration (NOAA)

- Sea Grant
- Oceanic and Atmospheric Research (OAR)

OSU researchers secured approximately \$11 million in competitive grants from NOAA last year.

National Aeronautics and Space Administration (NASA)

- Science Mission Directorate

OSU researchers secured over \$5 million in competitive grants from NASA last year.

National Institute on Standards and Technology (NIST)

- Technology Innovation Program (TIP)
- Manufacturing Extension Program (MEP)

Department of Defense (DOD)

- Basic Research (6.1)
- Office of Naval Research

OSU researchers secured over \$15 million in competitive grants from the DOD last year.

Department of Energy (DOE)

- Office of Science
- Advanced Research Projects Agency for Energy (ARPA-E)
- Energy Innovation Hubs
- Energy Efficiency and Renewable Energy programs

OSU researchers secured over \$19 million in competitive grants from the DOE last year.

United States Geological Survey (USGS)

OSU researchers secured approximately \$5 million in competitive grants from the USGS last year.

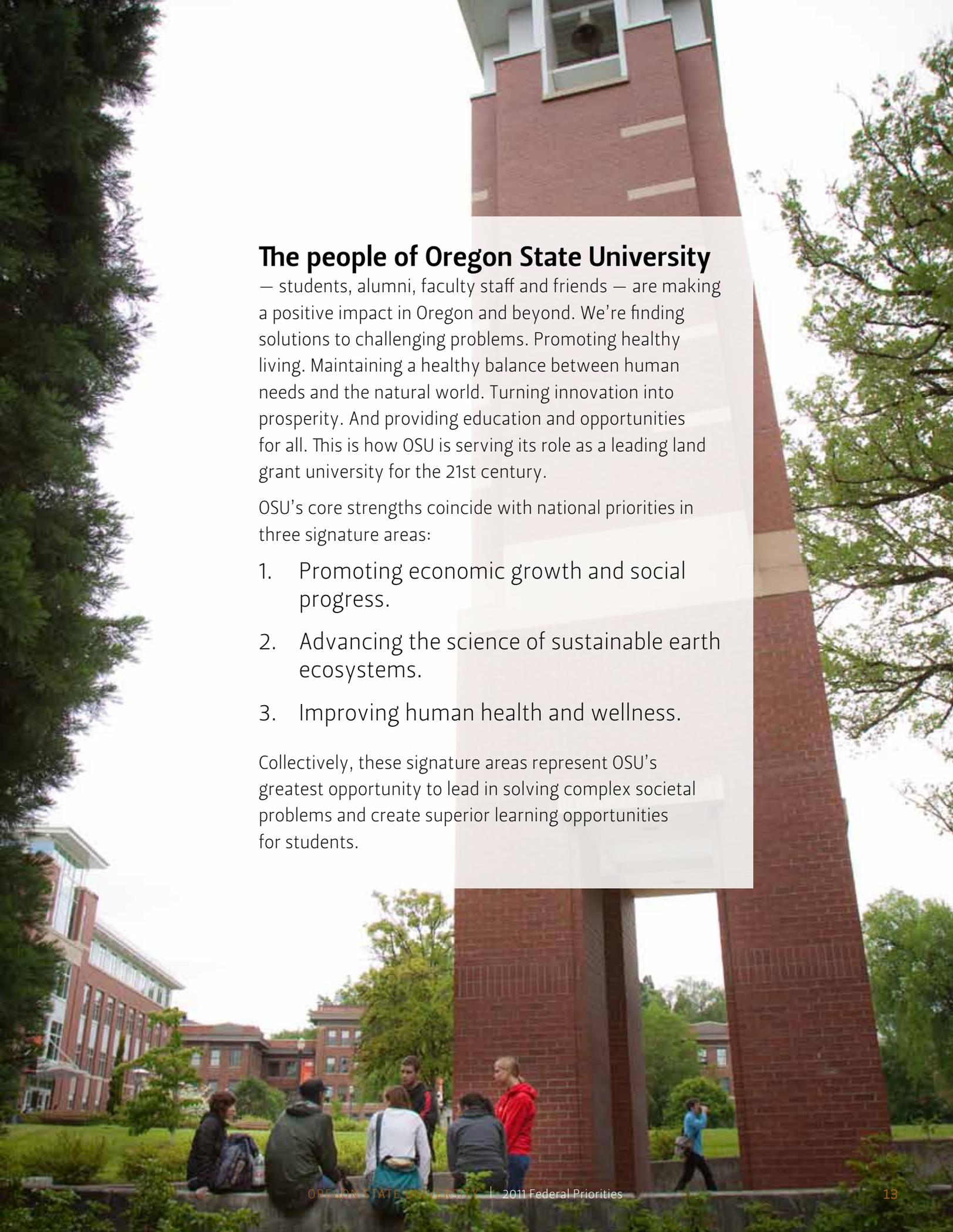
National Institutes of Health (NIH)

OSU researchers secured approximately \$27 million in competitive grants from the NIH last year.

Department of Education

Key programs within the Department of Education provide access to higher education for financially needy students. OSU supports the following federal financial aid programs:

- Pell Grant
- Federal Work-Study
- Perkins Loans
- Javits Fellowship Program
- Graduate Assistance in Areas of National Need (GAANN)



The people of Oregon State University

— students, alumni, faculty staff and friends — are making a positive impact in Oregon and beyond. We're finding solutions to challenging problems. Promoting healthy living. Maintaining a healthy balance between human needs and the natural world. Turning innovation into prosperity. And providing education and opportunities for all. This is how OSU is serving its role as a leading land grant university for the 21st century.

OSU's core strengths coincide with national priorities in three signature areas:

1. Promoting economic growth and social progress.
2. Advancing the science of sustainable earth ecosystems.
3. Improving human health and wellness.

Collectively, these signature areas represent OSU's greatest opportunity to lead in solving complex societal problems and create superior learning opportunities for students.



ECONOMIC Growth and Social Progress

OSU nurtures a culture of innovation that encourages research and discovery, creating economically powerful solutions to America's critical challenges and empowering the free market.

In addition to traditional agricultural research, OSU boasts nationally ranked engineering programs and well-known entrepreneurship and family business programs. The university's focus on distinctive areas like nanotechnology, sensor design and interfaces, tsunami wave research, nuclear engineering research, and wood product innovation creates a culture of creative solutions that impact economic growth and social progress. OSU is also pursuing breakthrough advances in renewable and alternative energy, green building technology and resource and enterprise sustainability.

Nanotechnology Research: Creating Jobs in Oregon

OSU supports President Obama's goals related to innovation and job creation. One way that OSU contributes to economic prosperity is through innovation and commercialization efforts in the field of nanotechnology.

OSU, in collaboration with Portland State University, the University of Oregon and the U.S. Department of Energy's Pacific Northwest National Laboratory, is leading the nation in cutting-edge research in the field of nanotechnology through the Oregon Nanoscience and Microtechnologies Institute (ONAMI). ONAMI will continue to partner with federal and state governments and private partners in the following areas:

Mobile Military Energy: Research on microtechnology energy and chemical systems has shown mass and heat transfer are best accomplished in massively parallel microchannels. Application of this principle can lead to dramatic acceleration, miniaturization and distribution of chemical, thermal and biomedical processes — with potentially revolutionary results. In addition to the many

military energy applications now being developed, other promising efforts are addressing medical devices and specialty chemical production. Several spinoff companies and Oregon businesses are now involved in this technology.

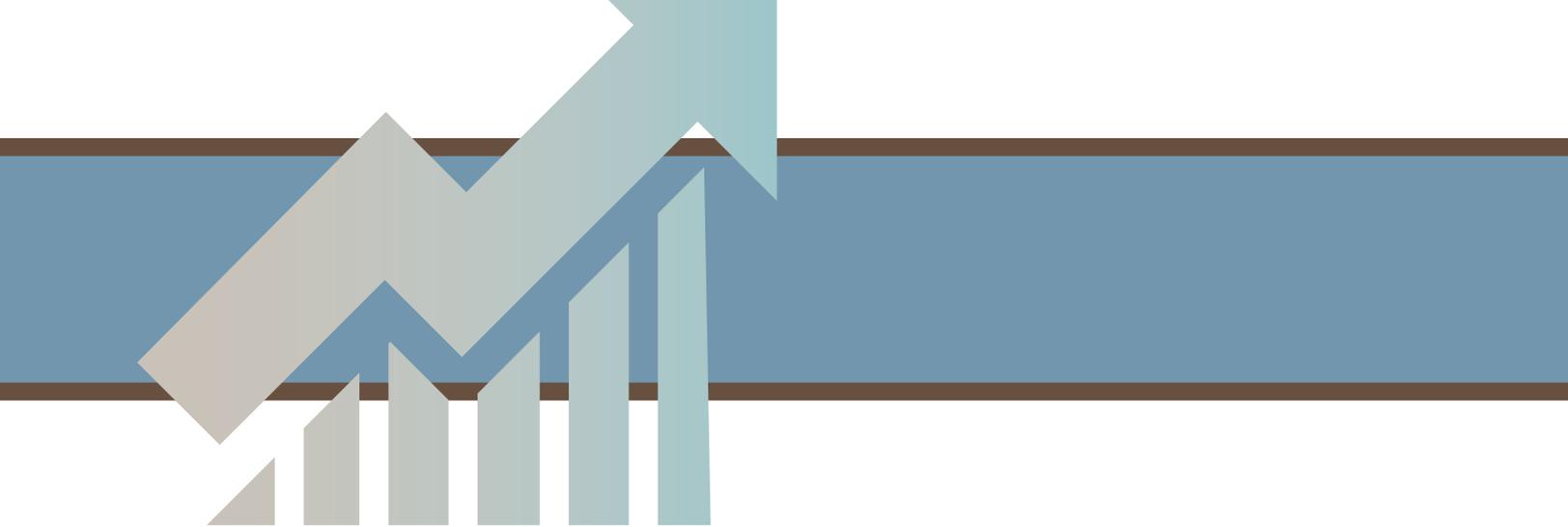
Nanoelectronics, Nanobiotechnology and Nanometrology:

Research in this area combines the necessity of accurate measurement — an increasingly pressing problem for semiconductor industry progress — with strong regional, industrial and academic experience in microscopy, analytical tools, and test and measurement. Advances in electron and ion microscopy resolution (emitters, optics), photoelectron microscopy, near field scanning optical microscopy and approaches to semiconductor metrology are being applied to real-world problems such as characterization of carbon nanotube emitters for displays and optoelectronic material produced in diatom-based bioreactors.

Safer Nanomaterials and Nanomanufacturing: Research in this area applies the principles of green chemistry to achieve safe and economically viable nanomaterial production processes, enabling the military deployment and commercial success of the most sophisticated nanotechnologies. A successful example of ONAMI collaboration is the application of microchannel reactors to nanomaterial synthesis — further improving the precision, control, efficiency and scalability of nanomaterial production. This has been demonstrated by higher throughput and quality Au11 production in capillary reactors and microreactor-assisted deposition of photovoltaic layers. Recent research commercialization advances in this field, led by Inpria Corporation, hold significant promise for the emerging printed electronics, nanolithography, flexible display and photovoltaics markets.

Agricultural Research: Responding to Stakeholder Needs

OSU researchers collaborate with farmers across Oregon, responding to their needs to keep crops competitive,



maximize profits and strengthen the state's agricultural economy. Congress has historically supported a few specific agricultural research areas in Oregon. OSU seeks Congressional support for competitive research accounts including USDA's Agriculture and Food Research Initiative (AFRI) and the Specialty Crops Research Initiative, among others, to boost programs in the following areas of agricultural research:

Multi-Commodity Research: This project enhances competitiveness and expands the economic value-added component of Oregon agricultural products through research and outreach in food processing, product development, business strategy, marketing and consumer testing. Activities funded by this program will create jobs by improving the ability of new and existing food producers and processors to satisfy national and international consumer and market demand by providing technical assistance and marketing strategies for small and medium-sized firms in the Pacific Northwest.

Wood Products Research: The goal of this project is to initiate creative and innovative science, technology and advanced business practices to enhance the domestic and global competitiveness of the U.S. wood products industry. The program encourages sustainable and environmentally acceptable product manufacturing and forest operations, leading to greater and more efficient use of renewable wood-based materials.

Small Fruit Research: Research priorities for each small fruit crop are established by the combined efforts of industry representatives and scientists. They are based on constraints on production and processing in the areas of breeding, pest management, physiology, processing/packaging and marketing with the ultimate goal of enhancing international and national profitability and sustainability for a number of crops.

Organic Cropping: The primary research objective of this project is to position Oregon as a regional and national

supplier of organic dairy, fruit, vegetable and seed crops. Research directed at problems facing these commodities will enhance the competitiveness of Oregon agriculture in the national and international marketplace while protecting and enhancing Oregon's natural resources. Previously funded project initiatives include creating a Crop Cover Calculator, establishing pest control techniques and developing nutrient management strategies for certain crops.

Molluscan Broodstock: This program is based at the Hatfield Marine Science Center in Newport, Ore. The project implements a selective breeding program to improve desirable traits of farmed oysters and to increase commercial production of Pacific oysters. Research includes improvement of larval survival and growth as well as breeding.

Wheat Research: The STEEP research grant has enabled development of cropping techniques such as direct seeding, residue management, weed control and disease and nutrient management. The grant has also enabled extension programs to support adoption of successful conservation farming techniques for dryland cropping systems — including wheat farming — in the Pacific Northwest. Future investments will establish a network of agricultural research sites from which to address long-term agricultural, environmental and social sustainability. A long-term approach is necessary because of the complex biological, social and economic systems involved.

Grass Seed Cropping: Research includes identifying grass seed crop management practices that address problems in cropping systems where burning of crop residues is no longer allowed. The grant addresses specific challenges, including management strategies for insect, disease and vertebrate pests, protecting genetic diversity, identifying germplasm resources for alternate production strategies and alternative uses for post harvest residues.

Protecting Small Fruit Crops

The spotted wing drosophila, an invasive vinegar fly native to southeast Asia, made its first big appearance in North America in 2009, and researchers from Oregon State University are part of a multi-state, multi-agency effort working to combat this damaging pest, which threatens fruit crops along the West Coast.

Funded by a \$5.8 million grant from the U.S. Department of Agriculture and \$4 million of in-kind Oregon contributions, the grant allows the research team to intensify monitoring and field research during the upcoming growing season and to expand investigations of life history, reproduction and effective controls. OSU researchers are working with the U.S. Department of Agriculture-Agricultural Research Service and the Oregon Department of Agriculture, along with colleagues in California and Washington.

The stakes are high, and both growers and scientists are concerned. The fruit industry is a multi-billion dollar enterprise in Oregon, Washington and California. Tests have confirmed that the spotted wing drosophila will feed on a wide range of grapes, berries, cherries, peaches and plums grown in the region. And unlike other vinegar fly species, the spotted wing drosophila prefers ripe, ready-to-harvest fruit.

Damage from the fly was rapid and intense. California lost a significant portion of its cherry crop in 2009; Oregon growers lost up to 20 percent of their blueberries and raspberries and up to 80 percent of their late-season peaches.

The team launched field and laboratory tests to learn how the fly might survive the winter, how quickly it reproduces, at what ripeness the fruit is most vulnerable and what kinds of controls would be most effective.



“We’ve developed a monitoring and reporting system to help us track the fly’s activity throughout the West Coast and provide early alerts to growers,” says OSU entomologist Amy Dreves.

OSU and USDA researchers have met with hundreds of Northwest fruit growers, mobilizing a monitoring force to help track the fly’s presence throughout the region. They handed out small plastic displays of mounted flies and descriptions for easy identification. They developed inexpensive traps from plastic cups baited with apple cider vinegar and loaded with sticky flypaper. And they showed growers how to test for the presence of the drosophila larvae by dunking a sample of crushed fruit into a clear container of sugar-water (the larvae, if present, quickly float to the top).

The researchers have also tested the effectiveness of dozens of chemicals, from full-spectrum insecticides to organic bait sprays that can be used to attract and kill flies before they lay eggs. But they know this is not a problem that can be wiped out with a barrage of chemicals. Jeff Miller, an OSU insect ecologist on the research team, warned that controls must not harm pollinating insects or other beneficial organisms that are necessary for healthy orchards and fruit fields. The research team is concerned about increased human exposure to pesticides, and they want to avoid secondary pest outbreaks that might result from new or more powerful pesticides.

SUSTAINABLE Earth Ecosystems



OSU possesses a distinctive, world-class capacity to improve understanding and sustainability of the ecosystems upon which all life depends.

OSU's nationally top-ranked programs in oceanic and atmospheric sciences, agriculture, forestry, geosciences, fisheries and wildlife, marine resources, botany, zoology and natural-resource related humanities and arts — augmented by the scientific and policy expertise of major federal research laboratories on campus — give OSU unmatched knowledge in the study of earth ecosystems and related issues such as climate change, food security and safety, renewable energy production and economically viable natural resource management.

The Ocean: A Source of Information

Hatfield Marine Science Center Research Space: Located on the shores of Yaquina Bay in Newport, Oregon State University's Hatfield Marine Science Center (HMSC) is internationally recognized for its interdisciplinary approaches to research on ocean and coastal ecosystems, fisheries and other marine resource management issues. Since its founding in 1965 as OSU's marine research station and public aquarium, the HMSC has become one of the leading marine laboratories in the U.S., serving as a national model for academic/government/industry collaboration in research, education and outreach.

Six federal and state agencies have research labs and offices on the HMSC campus, encouraging collaborative research among OSU and its partner agencies: the National Oceanic and Atmospheric Administration, U.S. Department of Agriculture, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife and the U.S. Geological Survey.

These university and agency-sponsored programs represent an employment base of more than 300 people and a combined budget of more than \$40 million in opera-

tions based in Newport. Buildings on the 49-acre campus include modern research and teaching laboratories and a 20,000 square foot research library. An extensive seawater system allows experimental research in tanks and laboratories. The campus supports investigations in marine biology and ecology, oceanography, botany, microbiology, zoology, geochemistry, genetics, marine fisheries and aquaculture. Collaborative research between OSU and partner agencies lie at the core of HMSC's mission, and shared facilities provide opportunities for information exchange and cooperative activities among scientists and staff from different programs and disciplines.

Newport is home port to the UNOLS vessel *Wecoma* and the coastal vessel *Elakha* through the OSU College of Oceanic and Atmospheric Sciences' ship support building and docking facilities at HMSC.

OSU seeks federal support to accommodate growth in this research sector by expanding lab research space.

A Clean Energy Economy

Wave Energy Mobile Ocean Test Berth Infrastructure and Research: The combination of key facilities, scientific expertise, successful marine energy research and collaboration, tremendous marine energy potentials and well-suited geography make the Pacific Northwest a prime site for future federal investments in these important technologies. In fall 2008, OSU and the University of Washington were named the U.S. Department of Energy's Northwest National Marine Renewable Energy Center (NNMREC). Through the efforts of, and investments leveraged by NNMREC, Oregon is internationally recognized as the U.S. leader in wave energy development.

The purpose of NNMREC is to help move power generation from waves, ocean currents and tides from the laboratory to part of the nation's alternative energy future by providing testing facilities, services, information sharing and educational outreach and engagement with coastal communities.



OSU seeks federal support to complete development and construction of the nation's first full-scale open ocean wave energy test facility. The U.S. marine energy industry is currently hampered by the lack of full-scale test facilities, forcing U.S. companies to Europe to construct and test their prototype devices. The U.S. ocean test facility will be available to industry and public entities who need a location to test wave energy devices and their impacts. This type of field testing is essential to appropriately characterize device performance and possible environmental effects, as well as for system optimization.

In concert with development of the test berth, NNMREC seeks support to characterize and monitor the potential impacts of marine energy infrastructure and devices on the marine ecosystems, by conducting ecological and environmental studies and modeling focused on electromagnetic fields. This research is a necessary prerequisite for test facility licenses and to provide educational outreach and engagement on marine renewable energy issues with local coastal communities.

Ultra Capacity/Battery Hybrid Energy Storage Device for Marine Combat Vehicles: Warfighters must be self-sufficient during their missions. The typical soldier carries approximately 66 lbs. of batteries to power portable radios, night vision devices and emergency location buoys. Unfortunately, these power sources fall short of their projected energy capacity. Battery performance can be enhanced with a hybrid design featuring a high-energy-density ultracapacitor. Researchers at OSU have a unique approach to producing critical ultracapacitor electrode materials in technologically important quantities, as well as in providing electrolytes that can meet U.S. Navy specifications.

This program will develop a novel class of lightweight Lithium Ion Capacitors (LICs) that will result in a 100 percent increase in both power density and energy density over the current state-of-art technology, providing 20 kW/kg of available power and 30 Wh/kg of energy storage. When coupled to a high-energy density battery, the

resultant hybrid power source will reduce battery weight and volume by 50 percent. OSU will work with energy storage device manufacturer Maxwell Technologies of San Diego to co-develop the LIC power source for the Navy.

Preparing for Natural Disasters

Center for Cascadia Subduction Zone Earthquake Community Survival and Resilience: The Cascadia Subduction Zone lies off the Pacific coast between Southern Canada and Northern California. Recent scientific analysis shows that there is a high probability of an earthquake with an estimated magnitude of 9.0 or greater in the next 50 years. The potential geographic scale of such an earthquake and the resulting impacts make it imperative that we create the knowledge needed to strengthen our infrastructure to survive and rebound from such a large and potentially nationally debilitating hazard.

OSU seeks federal support to establish a research center to enable communities in Oregon, Washington, California, Alaska and Hawaii to survive and rebound from an inevitable Cascadia Subduction Zone Earthquake (CSZE). Federal funding would create a laboratory that would produce detailed shaking and tsunami hazard maps, generate synthetic strong ground motion records of subduction during earthquake events for use in design and analysis, as well as in producing new materials and designs that can harden civil infrastructure — including houses, buildings, pipelines, transmission lines, communications, ports, harbors, bridges and transportation systems — to withstand CSZE shaking.

The center will work with emergency planners and first responders to identify vulnerable structures and likely event scenarios, as well as develop mitigation strategies. It will enable improved hazard response by mapping life-line and transportation network fragility and help establish plans for emergency response, evacuation and reconstruction, along with outreach to help citizens harden and provision their homes to survive an earthquake and endure the time required for aid to reach the area.

OSU Leading the Nation's Climate Change Research

Pacific Northwest Climate Decision Support Consortium

Through a five-year, \$3.5 million grant from the National Oceanic and Atmospheric Administration, Oregon State University is establishing and coordinating the Pacific Northwest Climate Decision Support Consortium, a regional consortium of climate variability assessment, research and outreach.

OSU researchers will work with colleagues from the University of Oregon, Boise State University, University of Idaho, and University of Washington — as well as Extension programs from Oregon, Washington and Idaho — to address climate assessment needs for businesses, state and federal agencies, municipalities, tribal leaders and non-governmental organizations in the Pacific Northwest. The goal is to help them make sound business and resource management decisions based on scientific climate assessments.

“Next-generation climate services need to do a better job of engaging stakeholders on their needs relating to climate variability,” says Philip Mote, a professor of atmospheric sciences at OSU and director of the Oregon Climate Change Research Institute. “It’s not a question of merely reciting potential impacts of climate change; it’s helping agencies and businesses develop climate-resilient strategies for long-range planning in managing landscapes, water and energy.”

One example is collaborative research by OSU’s John Bolte and UO’s David Hulse that uses Geographic Information System (GIS) technology to develop community and regional environmental assessments and planning. Together they have worked with community leaders on assessing alternative futures for the Willamette Valley and for the near-shore region of Puget Sound.

According to OSU sociologist Denise Lach, different businesses and agencies all have their own concerns

and priorities related to climate variability, “whether it might be urban growth, wildfire risk or land use.” An extension climate specialist will be part of the project, building networks and connections necessary for developing usable climate information for different stakeholders.

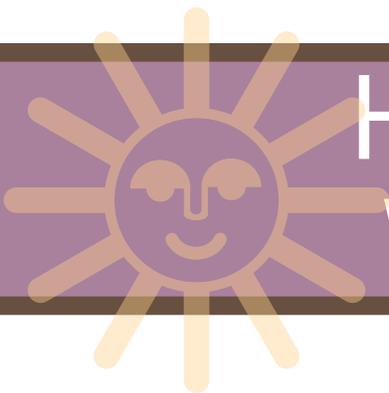
Northwest Climate Science Center

The U.S. Department of the Interior has chosen a consortium of three universities — Oregon State University, University of Washington and University of Idaho — to lead the Climate Science Center for the Pacific Northwest, one of eight such centers planned nationwide. OSU will host the administrative core of the center.

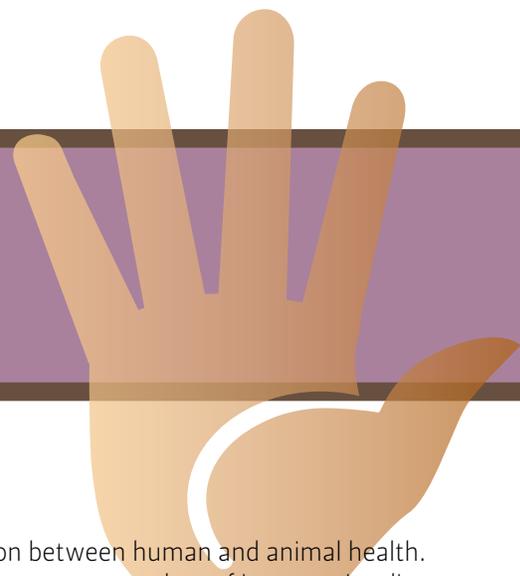
As described by Secretary of the Interior Ken Salazar, the initiative will bring together expertise in climate science ecology and impacts assessment and information technology, focusing primarily on science to support agency decisions within the interior department. He notes changes in temperature, rain and snowfall will have significant impacts on streams and the salmon they support, as well as on forests and agriculture.

“OSU brings to the center the nation’s top-ranked conservation biology research and nationally ranked programs in fish and wildlife research and the strengths and connections of a land grant university,” Mote says. “The university also boasts rapidly growing programs in applied climate research, and extensive connections to landscape and species management agencies in the Northwest.”

The university side of the center has initial funding of \$3.6 million over five years, which will provide logistical support for federal scientists and train graduate students. The federal side of the center will eventually bring three or more scientists to both OSU and UW, and allow the UI to house the computing infrastructure. Additional funding will provide competitive grants for which researchers may apply.



Health and WELLNESS



With three health-related colleges, including Pharmacy, Veterinary Medicine and Health and Human Sciences, along with significant national and international research in health and life sciences across the university, OSU is uniquely positioned to enhance the quality of the human lifespan.

OSU is home to highly ranked programs that respond to some of the most challenging issues facing us today, focusing on building more holistic and interdisciplinary approaches to healthy aging, chronic infectious disease control, new drug development, mental health and disease prevention to enhance the human lifespan, decrease health care costs and maintain a healthy population.

Public Health Assistance to Communities: The aims of America's health care reform and specifically the Affordable Care Act can only be met if the population is healthy at its baseline. Keeping Americans healthy requires a robust public health system with fully functioning local health departments (LHDs).

OSU proposes to apply its land grant extension infrastructure, in collaboration with its school of public health, to enable LHDs to assess population health status and public health needs, develop strategic plans and establish a quality improvement process. This will support the infrastructure necessary to create healthy communities that can realize the goals of federal health care reform.

OSU, along with local partners, will establish a practice-based research and assessment network, conduct workforce development training conferences for county public health staff about community health assessment and program evaluation, and establish cooperative agreements between county public health departments and OSU Extension offices to maximize county, state and federal investments. The project will establish a new model for public health infrastructure to improve efficiency among county, state and federal public health and human service programs.

Innovative Approaches to Control Mycobacterial Diseases: OSU has expertise in research related to public health

and the intersection between human and animal health. Mycobacterial diseases are one class of interspecies disease that pose a significant public health concern. These include tuberculosis (*M. tuberculosis*), leprosy (*M. leprae*), Buruli ulcers (*M. ulcerans*) and a variety of pneumonic and gastrointestinal diseases caused by environmental mycobacteria (principally *M. avium*).

OSU seeks federal support for a multidisciplinary research infrastructure and mycobacterial disease research and management, which will allow for focused studies on Johne's disease. Johne's disease is a chronic infection of cattle, sheep and goats caused by *Mycobacterium paratuberculosis*, one of several mycobacteria that are responsible for a number of devastating diseases affecting humans and animals.

Johne's disease represents a significant economic problem for farms in the U.S. — Oregon in particular — with infected herds leading to significantly reduced milk production. Lost productivity costs to the U.S. dairy industry due to Johne's disease are estimated at approximately \$200 to \$250 million annually.

Food Safety and Traceability: Recent food recalls threatening public health have diminished consumer confidence in U.S. food production systems and have resulted in significant economic losses for producers. OSU has the expertise to conduct necessary research on technical and economic studies of full chain traceability for non-commodity food systems in the U.S.

OSU seeks federal assistance to allow researchers to work closely with industry to develop and collect the critical information needed to implement effective automated traceability systems that will improve food safety (recalls), quality and productivity in Northwest foods. Ideally, this research will lead to a more transparent supply chain and create more efficient cost-saving management systems for inventory, shipping and receiving. A key goal of the research is to investigate the economic and technical feasibility of how emerging technologies can be applied to improve effectiveness of automated traceability in a variety of food systems.

Teeny Little Steps:

Small changes can pay big dividends for overweight kids



Oregon State University associate professor Stewart Trost is fighting childhood obesity and boosting kids' health by emphasizing what they do naturally: running, jumping and playing.

60 Oregon childcare homes are participating in Trost's Healthy Home Child Care Project. The premise: You don't need fancy jungle gyms or pricey cuisine to make kids healthy and keep them that way. Instead, Trost and his graduate students are pursuing basic and practical strategies in their program, which is funded by the National Institute for Food and Agriculture.

"We're making the intervention as simple as possible," says doctoral student Kelly Rice, who is coordinating the study. "We're looking for really little things that can make a huge difference, things like giving kids balls and bats to play with, adding a couple of veggies to the lunch menu — teeny little steps."

Trost has rapidly become one of the world's foremost researchers on issues related to physical activity in children and youth. After earning his bachelor's degree in exercise physiology from Oregon State he worked as a corporate fitness director, discovering it's a tough task to try and sell exercise to a sedentary adult. While earning his Ph.D. at the University of South Carolina in the mid-1990s, he determined that it was time to take action — and that the solutions to the nation's obesity problem must take root in childhood.

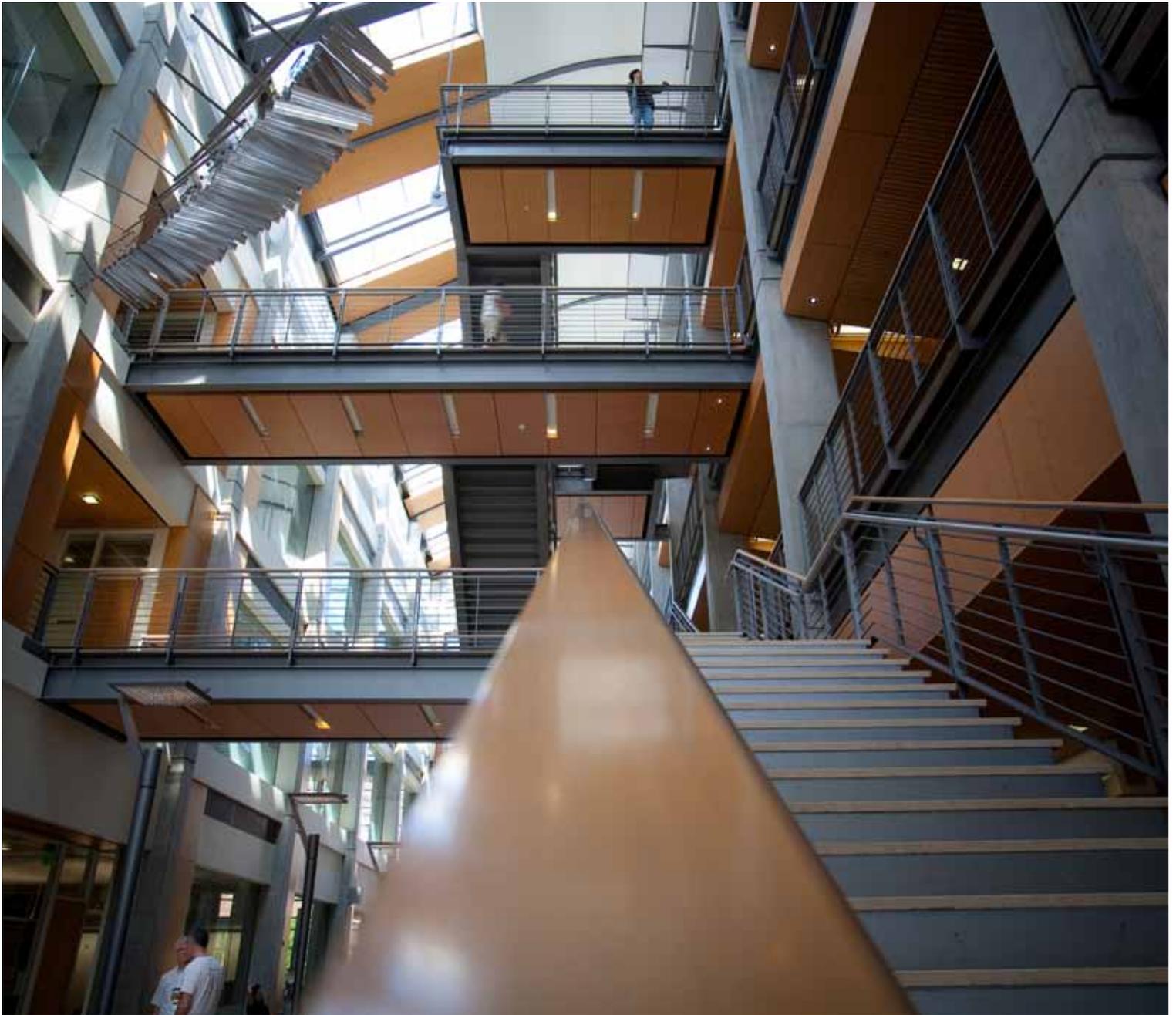
So he's waging a sustained research campaign to find a way forward for children's health, partnering not only with childcare workers but also with doctors. With their knowledge of the medical risks of obesity, doctors can bring up children's diet and exercise choices more easily than can teachers or even parents.

Schools, too, must play a pivotal role. With the Robert Wood Johnson Foundation's Active Living Research program, for instance, Trost is crafting a policy statement challenging the trend of cutting physical education to boost instructional time.

"There are a number of studies showing improved academic performance with increased activity during the school day, he notes. "When kids get activity breaks, they're more attentive in class, which facilitates better learning."

By playing harder and eating smarter, kids can not only learn better at school but also lay the foundation for vitality and longevity. Trost's message is this: You don't have to take up mountaineering, compete in a decathlon or eat only bean curd and baby spinach to prevent chronic disease and optimize health. In fact, the preventives are right in plain sight.

"Kids don't need a \$150 inflated castle in the backyard," Trost says. "An obstacle course with lawn furniture or a fort fashioned from a blanket thrown over a card table can encourage both imagination and physical activity."



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