

OSU & Oregon: RECOVERY, Powered by Orange



A White Paper from Oregon State University

Oregon State
UNIVERSITY

Executive Summary



The economic recession that continues to plague the United States has been felt especially keenly in Oregon, where unemployment rates, housing foreclosures, investment losses and more have created an atmosphere of financial pain and pessimism. Indications are growing that the nation may now be in the early stages of economic recovery. In Oregon, though, concerns persist that this state — typically among the last to feel pressure in a national economic downturn and among the last to recover as conditions improve — will remain in a depressed state for some time. Oregonians are looking for signs that organizations and institutions with the capability to be catalysts for this state's economic recovery are making serious contributions in that regard and that those contributions are effective.

Oregon State University made unprecedented contributions in 2008-09 toward economic growth and sustainability for the state of Oregon, despite serious challenges to its own financial well being. As the state's Land Grant university, deeply committed to providing high-quality educational opportunities for the people of Oregon, OSU fulfills critical access needs in academic areas of strategic importance. But its success as a modern research university has been made significantly more robust its singular economic contributions in recent years — contributions that OSU is poised to make in record-breaking, catalytic ways in the new academic year:

- The university's **wide-ranging, nationally competitive research program now earns more than a quarter-billion dollars annually** in contracts and grants, is spinning out record numbers of high-tech businesses and is returning growing proceeds in licensing and other technology transfer revenue.
- Increasingly **the campus of first choice for many of this state's best and brightest students**, OSU will enroll its largest and most academically high-performing student body ever, with burgeoning enrollments in singular programs that feed sectors and industries critical to Oregon's future.
- OSU is making its mark in **academic programs that are increasingly ranked among the nation's best** in disciplines critical not just to Oregon's future, but to the future of a sustainable, evolving planet and a dynamic, healthy economy.
- The university's **abiding commitment to Oregonians** will manifest this year in ways ranging from financial assistance that will allow thousands of Oregon students to attend for free, to a capital campaign that has raised more than a half-billion dollars to ensure the viability of this leading research university for generations to come.

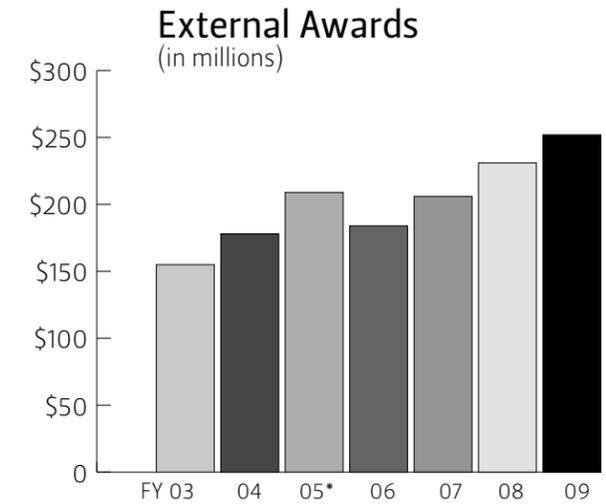
This report details growth within these areas, future directions for the university and other factors behind OSU's ever-increasing impact in Oregon and beyond. It provides an overview of some of the most important contributions that OSU makes to this state and to higher education in general and, in so doing, offers ample illustration of how Oregon is "Powered by Orange."

Record research investments, outcomes

In 2008-09, Oregon State University faculty researchers were awarded more than a quarter-billion dollars in scientific contracts and grants. The \$252.16 million total in external awards — a \$21-million increase over the previous year and a rise of near \$100 million since 2003 — is marked by the diversity of federal funding sources, the most competitive arena for scientific research support. Fifteen percent of OSU's research funding comes from the National Science Foundation, with the Departments of Agriculture, Health and Human Services, Defense, Commerce and Energy each providing support ranging from \$27.8 million to \$10.5 million. All told, federal support accounted for \$189 million of OSU's external research support.

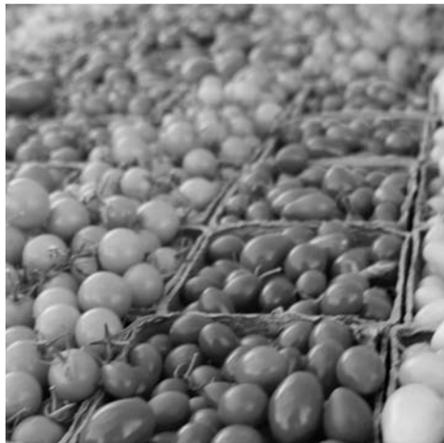
That funding fuels projects that have substantial and increasing potential for scientific understanding and economic impact, among them:

- **Wave Energy:** OSU is an international leader in the research and development of ocean wave energy and is largely responsible for the emergence of multiple commercial wave energy projects on the Oregon coast. Through the newly established Northwest National Marine Renewable Energy Center, the Wallace Energy Systems and Renewables Facility and the Hatfield Marine Science Center, OSU engineers and scientists are developing the most effective technologies to harness wave power as an alternative energy source in ways that have minimal impact on the natural environment. OSU's work in this area has resulted in the formation of the spinoff company Columbia Power Technologies, as well as multiple engineering innovations.
- **Healthy, Sustainable Food Systems:** OSU's historic strength in agricultural sciences manifests today in ever more inventive, high-tech ways to ensure an abundant, safe and healthy food supply. Wheat varieties created at OSU, for instance, are planted on hundreds of thousands of acres throughout the Pacific Northwest and serve as a major export crop. Innovations in other areas ranging from integrated pesticide management to developing healthier potatoes to making better use of agricultural lands are playing significant roles in bolstering healthy diets and reducing negative impacts on the environment. Likewise, OSU contributions to Oregon's fish and seafood industries are exceptional, with work at the OSU Seafood Laboratory and Food Innovation Center introducing and/or driving success of products like surimi and "oyster shooters," and charting other successes in product safety and hatchery management. OSU also makes invaluable contributions to Oregon's globally recognized wine and craft/microbrew industries through research and one of the nation's only Fermentation Science degree programs.



* includes a record \$24.5 million to the OSU-led Partnership for Interdisciplinary Studies of Coastal Oceans





- **Nuclear Engineering:** Nuclear engineering today is experiencing a renaissance, due in no small part to the groundbreaking research in OSU's internationally prominent Department of Nuclear Engineering and Radiation Health Physics. Under the leadership of Professor Jose Reyes, OSU helped pioneer the next generation of "passively safe" nuclear reactors that have fewer moving parts, rely on natural processes such as convection, and are already under construction in China. Beyond that, OSU and a Corvallis-based spinoff company, NuScale, have created modular reactors so small that they can fit on a railcar, be shipped to where they are needed, incorporate passive safety features, help address proliferation and nuclear security concerns and may open up nuclear energy applications in many places never before considered. This innovative reactor design is under review by the Nuclear Regulatory Commission and has secured two substantial rounds of venture capital funding.

- **Preventive Medicine and Optimum Health:** Anchored by the Linus Pauling Institute and the colleges of Science and Health and Human Sciences, OSU is making major contributions to healthy living through vitamin and micronutrient research, research on disease prevention, studies of the effects of exercise on physical well-being and more. This work was supported by more than \$25 million in contracts and grants from the federal Department of Health and Human Services alone in 2008-09; its importance has been recognized through such designations as the Institute's status as a "Center for Excellence for Research on Complementary and Alternative Medicine," awarded by the National Institutes of Health.

- **Drug Development:** OSU researchers are developing drugs and pharmaceutical treatment approaches for a variety of diseases affecting humans and animals around the world. OSU's work in this area is a substantial component of the Oregon Translational Research and Drug Development Institute, OTRADI, launched in 2007 as the state's newest signature research center. One initial success is the development of "Hua Cat," a new organic catalyst that offers significant advantages over the catalysts used to manufacture approximately 90 percent of the drugs under development today. The Hua Cat project earned backing from the University Venture Development Fund in 2008 and entered commercial production in the Willamette Valley in 2009.

The rapid growth of OSU's research efforts is generating spinoff companies with products based on innovations from OSU labs. In FY '09, the Office of Technology Transfer assisted in the creation of four new start-ups, with product lines ranging from a highly efficient field tool for assessing nitrogen, chlorophyll and water testing of leafy plants to high-value natural supplements with potential in preventing cancer. Licensing agreements executed through Technology Transfer resulted in income of more than \$2.7 million to the university — a record — and nearly triple the amount that OSU licensees earned just 10 years ago. Companies and innovations emerging from OSU laboratories over the past several years include:

- **Inpria:** This Corvallis-based company uses an OSU innovation for creating inorganic printed and spun-on materials for high-performance, low-cost printed electronics. Those inorganic materials provide significant performance and cost advantages over traditional organic material approaches, and the Inpria/OSU team is already working on fabricating a liquid-crystal display, thin-film transistor test vehicle. This project, which has received University Venture Development Fund support and ONAMI Gap Funding, has gained additional support from DARPA, the Air Force Research Laboratory and HP, among others.

- **NuScale:** As noted previously, this Corvallis-based start-up has already obtained two rounds of significant venture capital to move its next-generation nuclear reactor design closer to fruition. The company entered the Nuclear Regulatory Commission's rigorous review process in 2007 and projects that the first NuScale reactors may be operational in power plants as early as 2015. The company's safe, small and scalable reactors feature passive cooling systems and advanced safety systems, and they can be built more quickly and economically than existing reactors.

- **Home Dialysis Plus:** This Portland-based company is seeking to make at-home kidney dialysis a reality for the tens of thousands of patients who currently can only receive treatment at clinic sites. Driven by OSU innovations in micro- and nano-technologies, Home Dialysis Plus' portable, cost-effective system will allow patients to experience the benefits of nightly dialysis in the privacy of their homes. For patients suffering from renal disease, Home Dialysis Plus promises to have life-changing potential.

Top Federal Awards 2008-09	
by agencies providing support in excess of \$10 million	
National Science Foundation	\$38.7 million
Dept. of Agriculture	\$27.8 million
Health and Human Services	\$25.3 million
Dept. of Defense	\$19.9 million
Dept. of Commerce	\$11.8 million
Dept. of Energy	\$10.5 million

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While companies started or spun off from OSU innovations and external funding for OSU scientific projects provide significant economic boosts for Oregon, the investments that OSU's scholarship and entrepreneurial research attract are having significant and increasing impact on this state. Nowhere is that felt more keenly than through the marine sciences, where OSU has emerged in recent years as one of the nation's leading programs.

- **The NOAA Marine Operations Center and Pacific Fleet** will soon move to Newport, following a decision announced in mid-2009 to relocate the fleet there from Seattle. Congressional estimates place the economic impact of the fleet at as much as \$500 million over the next 10 years, a sum that includes some 175 local jobs affiliated with the fleet's presence. The relocation would not have been possible without the existing presence of the OSU Hatfield Marine Sciences Center, which includes research offices representing numerous federal and state agencies, as well as a major presence of OSU marine scientists.
- **A seafloor mapping project** announced this year will use a combined \$7.3 million in federal and state funds to create the most detailed topographical depiction ever undertaken of the area off the Oregon coast, covering about one-third of State of Oregon waters and three-quarters of its rocky reefs. Researchers in the College of Oceanic and Atmospheric Sciences will lead the project, helping to fulfill Oregon's portion of a California-Oregon-Washington mapping goal established by the state's governors. The maps are critical to modeling tsunamis, identifying marine habitats, selecting alternative energy sites, identifying geological hazards and enhancing safe and efficient marine transportation, Oregon Gov. Ted Kulongoski said earlier this year.
- The recently announced **Ocean Observatories Initiative**, a \$386-million project headed by the National Science Foundation and the Consortium for Ocean Leadership, is working with OSU, Woods Hole Oceanographic Institute and the University of Washington to create a global ocean monitoring network. OSU will receive \$14 million in initial funding to deploy a system of surface mooring, seafloor platforms and undersea gliders that will give scientists an unprecedented look at how the ocean responds to changes in climate. The initiative also addresses ocean observing efforts called for in the West Coast Governors Agreement on Ocean Health signed by governors Ted Kulongoski, Arnold Schwarzenegger and Christine Gregoire.

OSU leadership in alternative energy research and development, likewise, is attracting increased federal investment in efforts focused on wave, hydrogen, biofuel, solar and wind energy, as is OSU's participation in statewide collaborative centers, designed to leverage the individual strengths of Oregon's research universities.

- **The Northwest National Marine Renewable Energy Center** was established last fall by the U.S. Department of Energy at OSU to step up development of electric power from ocean wave and tidal energy. OSU is the acknowledged national academic leader in this pursuit; through research at the College of Engineering's Wallace Energy Systems and Renewables Facility, it has played a significant role in making the Oregon coast one of the world's premiere locations for the development of wave and tidal power. The Center already has funding of \$13.5 million for the next five years, a combination of federal and state monies, and benefits through strong partnerships with the Hatfield Marine Science Center and Oregon Sea Grant program.
- **The Energy Frontier Research Center** project announced earlier this year by the White House and the U.S. Department of Energy included \$3 million in funding for the OSU Center for Inverse Design. The new center, one of 46 created nationally with \$777 million in funding, will use theory and computation along with other experimental methods to identify more rapidly the advanced materials that can make solar power less costly and more efficient.

- **Signature research centers** created by the State of Oregon over the past five years have featured significant contributions from OSU, most notably the Oregon Nanoscience and Microtechnologies Institute (ONAMI), the Oregon Built Environment and Sustainable Technologies Center (BEST) and the Oregon Translational Research and Drug Initiative (OTRADI). Collectively, the centers represent tens of millions of dollars in research projects undertaken by OSU researchers, as well as significant contracts and grants obtained by colleagues at Portland State University, Oregon Health and Science University and the University of Oregon. The oldest and most developed of the centers, ONAMI is headquartered close to OSU in Corvallis and has served as a model for institutional collaboration.

Fiscal Year	2008-09	2003-2009*
License Receipts	\$2,712,160	\$14,720,610
US Issued Patents	10	72
Executed Licenses	20	190

* Cumulative awards

Academically high-performing student body

Oregon State University has emerged in recent years as a campus of choice for the best and brightest students of this state. A spring 2009 survey of leading graduating seniors from high schools throughout the greater Portland area conducted by *The Oregonian* found OSU to be the destination this fall of more participants than any other college or university. That is no surprise, given that for the past several years, OSU has enrolled more Oregon valedictorians than any other university in the state. In fact, graduates ranked no. 1 in their class from 38 percent of all accredited Oregon high schools enrolled at OSU in fall 2008. This fall's entering class is expected to hold a collective 3.5 grade point average and will include record representation of racial and ethnic diversity.

Once at OSU, those students excel in an expanding array of academic programs, outperforming peers locally and in the Pacific Northwest. Accounting students, for instance, have earned an average pass rate of 41 percent on the CPA Exam over the past three years compared to the national average of 28 percent and have earned the highest pass rate in the Oregon University System three of the past four years. In fact, since 2007, OSU Accounting graduates have been the top three individual finishers on the state CPA examination. Their competitiveness is due in part to the rigor of their studies: The Accounting and Management Information Systems curriculum is one of only five higher educational campuses in the country and 13 globally to be certified by the Information Systems Audit and Control Association.

OSU students pursuing admission to medical school enjoy similar success: They are accepted at a rate nearly 30 percent above the national average, going on to such institutions as Harvard, Stanford, Cornell, Emory, Baylor, UCLA and Johns Hopkins. Many of those students are participants in the Howard Hughes Medical Institute Summer Undergraduate Research Program. Singular in Oregon to OSU, this program gives dozens of OSU students deep experience in research projects, helping them to connect scientific theory to real-world issues. Other medical/dental aspirants come from the University Honors College, OSU's most prestigious academic experience and one of a handful of honors programs nationally that confer their own degrees within any undergraduate major. As a result, OSU has been the principal feeder institution for Oregon Health & Science University, sending more students to medical school there than any other campus.

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Forty percent of the Honors College student body is drawn from the College of Engineering, which has emerged as an Oregon and West Coast force in engineering education. Engineering enrolls some 3,100 students each year, ranking the college first in Oregon and 25th nationally in the number of undergraduates who complete their studies each year. Growing numbers of students participate in programs that are often singular to OSU or in which OSU has demonstrated exceptional national leadership, such as ocean and tidal wave energy, nuclear engineering and radiation health physics, nanoscience and microelectronics and more. The college's graduates are in exceptionally high demand, both in Oregon's high-tech economy and beyond the state's borders.

Similar stories of student excellence and achievement at the undergraduate and graduate levels are consistent through OSU's various other colleges and programs, from Oregon's oldest and most prestigious College of Pharmacy to its influential College of Science to the rapidly growing College of Health and Human Sciences. Cumulatively, OSU confers some 4,300 degrees each year, providing the Oregon economy with graduates prepared to make an immediate difference in the workplace and meaningful contributions to the various industries in which they'll work. Thanks to an entrepreneurial education emphasis in the OSU College of Business and Weatherford Hall's Austin Entrepreneurship Program, the world's largest residence hall devoted to entrepreneurial studies, some graduates choose to start their own businesses, further contributing to the vitality of the Oregon economy.

Those graduates join a large and growing number of OSU alumni, now totaling some 153,000 nationally, 81,000 of whom live in Oregon. Of the latter number, nearly 41,000 call the greater Portland area home, comprising a significant portion of the state's largest metropolitan region's highly educated/highly skilled work force.



Academic excellence



Oregon State University is increasingly attractive to Oregon's best and brightest and top students overall because of the rising profile of its academic programs, at the very time that the subjects and issues most associated with them are of monumental importance nationally and globally.

OSU ranks no. 1 in the United States in Conservation Biology, the emerging scientific discipline most often linked with climate change issues. The influential journal *Conservation Biology* issued the rankings in fall 2007, and its review showed that OSU conservation biology research leads the nation in its influence, topping all other programs in the frequency with which scientists on other campuses cite OSU faculty members' work.

That ranking is illustrative of OSU's deep commitment to stewarding natural resources and to a healthy environment — a commitment born out in similar top rankings in related disciplines:

- No. 1 in North America in Forestry
- No. 1 nationally in Wildlife Science
- No. 1 nationally in Agricultural Sciences
- No. 2 nationally in Fisheries Science
- No. 4 nationally in Zoology
- No. 5 nationally in Plant Pathology
- No. 5 nationally in Forestry Resources
- No. 6 nationally in Geosciences

While the above rankings, all released within the past three years, are drawn from different sources and use different means to arrive at their numerical hierarchy, they typically measure faculty citations and publications — key indicators of a program's influence and strength — and in some cases, program reputation among others within the discipline.

Beyond the realm of natural resources, OSU's academic reputation is growing as well. Its graduate program in Nuclear Engineering and Radiation Health Physics, for instance, is ranked no. 8 nationally by *U.S. News & World Report* and growing significantly in enrollment and influence. The Oregon Master of Public Health program offered by OSU in conjunction with Portland State and Oregon Health & Science University, is ranked No. 2 in the nation in *U.S. News'* "Community Health" graduate rankings.



But more so than any other single disciplinary ranking, OSU's overall classification by the Carnegie Foundation for the Advancement of Teaching speaks to its modern reality as a leading research university. The Carnegie Foundation conferred upon OSU three years ago the "research university—very high activity" designation, reserved for the nation's 95 most prominent campuses. Considered by many in higher education to be the gold standard for university and college classifications, the Carnegie ratings for research institutions take into account multiple factors measuring academic quality and faculty productivity.

Oregon State is Oregon's only campus to hold the premiere Carnegie designation, and one of only three in the Pacific Northwest to do so. And unlike other university groupings, such as the Association of Public Land Grant Universities or the American Association of Universities, the Carnegie rankings are regularly updated and reassessed, making them a solid reflection of university performance and quality.



Oregon State is one of only three campuses in the Pacific Northwest to hold the premier Carnegie Foundation designation for research universities.

Commitment to Oregonians



OSU's mission for more than 140 years has been on providing the best, most relevant university education possible for Oregon's sons and daughters.

As one of America's original Land Grant universities — established as a result of the 1862 Morrill Act, which allocated federal lands to states to create colleges providing higher education opportunity for their respective citizens — OSU's founding mission was focused squarely on Oregonians. Though times have changed, the university's focus has remained fixed for the past 141 years on providing the best, most relevant university education possible for Oregon's sons and daughters.

In 2008, OSU launched a bold new experiment in service of that mission: The Bridge to Success Program, which allows qualified Oregon students to attend OSU free of all tuition and fee charges. Originally designed for an expected 1,400 participants in its first year, Bridge to Success kicked off in fall 2008 with more than 3,000 students, about half of whom also received assistance with books and supplies. Only one other similar program exists in Oregon, and it served about 400 students last year.

Despite difficult economic times, OSU remains committed to the program, which will continue this school year. To qualify, students must only be eligible for Pell and Oregon Opportunity Grants and be making progress toward their degrees. OSU covers whatever tuition and fee costs that remain through monies raised as part of the Campaign for OSU fund-raising effort and operational funds that have been redirected toward the Bridge to Success program.

That commitment manifests prominently at OSU-Cascades, the Oregon University System's first branch campus. The campus, founded to provide educational opportunity to students in the Central Oregon region, had its eighth-annual commencement ceremony earlier this year and has now produced nearly 1,400 graduates. More than 80 percent of them have come from Central Oregon; more than half are the first members of their families to have earned a college degree and about one-quarter are being served by the Bridge to Success Program. OSU-Cascades is expanding course offerings to serve even more students, and over the next two years will begin providing degree programs in subjects especially relevant to that region's economy including hospitality management and sustainability.

Serving Oregon students of all backgrounds is another dimension of OSU's commitment. This year's largest-ever entering freshman class, for instance, is not only marked by its academic achievement, but its diversity, and is projected to include increases in all racial and ethnic groups, as well as a significant increase in international students. OSU efforts to engage more deeply individuals of diverse backgrounds has resulted, in part, in significant growth among some populations, such as Latino/a students, whose numbers have doubled over the past decade.

Of course, no discussion of OSU's commitment to Oregon would be complete without noting that the OSU Extension Service and Experiment Stations have 40 locations, more than one in every Oregon county, and provide informal education opportunities that empower Oregonians, enhance communities and support economic opportunity around the state. Extension is as relevant in the 21st century as it has ever been, with programs serving urban master gardeners, families trying to stretch precious food dollars and students working to prepare for college.

OSU's commitment to Oregonians is also reflected in its leading practices in environmental stewardship. As noted above, OSU is a recognized leader in academic disciplines related to the natural world. It is also a leader in policies and systems that ensure the university "practices what it preaches" with regard to ensuring a healthy environment for Oregon.

Led by President Ed Ray who signed the American College and University Presidents Climate Commitment pledge, OSU in 2007 joined a then-modest number of universities nationally in an effort to make their campuses "climate

neutral" by establishing policies to limit greenhouse gas emissions and reduce energy usage. Since then, OSU students have instituted by overwhelming popular vote a "green power fee" that not only offsets the majority of the university's carbon emissions, but has seen OSU recognized twice by the U.S. Environmental Protection Agency as one of the nation's top five leaders in green leadership and by Kaplan College Guide as one of America's greenest college campuses.

OSU's commitment to Oregonians is further born out in the scholarships/fellowships component of the Campaign for OSU. Campaign organizers established a \$100-million goal for this area within the overall campaign goal of \$625 million, and has already raised \$83 million toward that mark (the campaign itself has now surpassed \$531 million). Other campaign priorities will have a direct impact on the academic experience that students from Oregon, as well as other domestic and international students, experience at OSU. More than \$202 million has been raised for academic programs, for instance, while another \$118 million has been raised for facilities and equipment. Donors have given \$160 million in new endowment monies, ensuring the health of OSU for generations to come. One in five OSU alumni have already contributed to the campaign, as have a total of some 50,000 donors overall.

In 2008-09, 16,590 of OSU's 20,320 students — nearly 82 percent — called Oregon home. As OSU continues to expand in coming years, the numbers of students from other U.S. states and scores of foreign nations will grow. But OSU's historic and current Land Grant mission will remain unchanged.



Additional economic impact



OSU's most recent study illustrated the university's \$1.5-billion economic footprint across the state of Oregon. In the two years since that report was issued, the university has grown in enrollment, research expenditures, overall expenditures, physical facilities and other ways, leading analysts to believe the university's overall impact is now significantly greater.

Projects underway or soon to start will further enhance those impact numbers:

- **The Linus Pauling Science Center** will begin taking shape this fall on the OSU Corvallis campus. With construction costs estimated at \$77 million, the 120,000-square-foot facility will be home to the Linus Pauling Institute, as well as faculty and students in chemistry, biochemistry and the life sciences. The center is named, of course, for OSU's most famous alumnus, the only person ever to win two Nobel Prizes as an individual.
- **A new \$52-million living/learning center** is in the planning stages, with architectural work now set to begin on the residence hall and construction projected to begin in May 2010. The facility will provide for an additional 320 students to live on campus. Many are expected to come from the groundbreaking partnership between OSU and INTO University Partnerships, a British firm retained to assist in recruiting international students. About 300 students are projected to be enrolled at OSU this fall through INTO, and the partnership will bring hundreds more to Corvallis in coming years.



- **The Hallie Ford Center for Healthy Children and Families**, launched this fall, is an exciting new component of the College of Health and Human Sciences. Funded in large part by an \$8-million gift from Oregon philanthropist Hallie Ford in 2007, the Center's physical home is projected to be built at a cost of \$10 million, with construction starting within the next two years.
- A \$5-million gift from an anonymous donor has provided key funding for a **Student Success Center** that will aid student graduation and retention at OSU through an array of academic support programs designed to help new and transfer students transitioning to the university

For information on sources used in the creation of this paper, please visit oregonstate.edu/leadership/president/whitepaper/sources





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