



2013 Annual **REPORT OF RESEARCH**



Our Research Enterprise

From the lab to application, we thrive on partnerships

Research is like the air we breathe. It is critical to everything we do at this land grant university. It enhances education for our students. It bolsters the economy with new products and services: transparent semiconductors, non-toxic wood adhesives, disease-resistant wheat, environmental monitoring systems. It deepens our understanding of culture and the arts. It informs public policy with factual information about the environment, health and technology.

Oregon State's globally recognized research enterprise has more than doubled in the past decade. The university is a pace-setter in research on climate science, wave energy, conservation biology, open-source software, forestry, agriculture and nutrition. We lead the design of the next generation of ocean-going research vessels, the development of novel "green" materials and the creation of a national ocean-observing program. Our researchers are renowned for assessing human health risks from pollutants in the United States and abroad. They advise state and federal agencies and international research organizations.

We don't take these accomplishments for granted. Today's challenges require that we partner with industry, individuals, government and universities. It takes expertise across many disciplines to find solutions anchored in the best science.

We see exciting new developments coming in key areas: robotics, information technologies, geospatial intelligence, renewable energy and health care. We envision a future in which we draw energy from many sources, save lives by preparing for natural disasters and enhance wellness as we age.

Our students and faculty connect theory and application, experiment with beneficial outcome. Our goal is the betterment of life in Oregon and around the world. Research partnerships – with companies, communities, foundations, universities and government agencies – will remain critical to our future.

Rick Spinrad
Vice President for Research

Growth in Licensing Spurs Research and Business Partnerships

Oregon State University recorded its best year ever in technology licensing – nearly triple what it earned just five years ago – during the last fiscal year, which ended June 30. Combined with continued growth in funding from private industry, the increase reinforced the university’s economic impact. It also cushioned a nearly 13 percent decline in federal funding stemming largely from budget cuts known as sequestration.

Oregon State research grants and contracts totaled almost \$263 million last year, just shy of its fiscal year 2009 level. Meanwhile, OSU received a record \$7.7 million in licensing and royalty income. Private sector financing reached nearly \$36 million, a 65 percent increase over the past five years, as calculated on an annual basis.

“Licenses are a measure of how effective we are in helping industry turn research into marketable products,” said Rick Spinrad, vice president for research. “By licensing the results of our research, they are increasing their value in the marketplace and creating jobs in Oregon.”

In the last year, OSU signed 88 new licenses with organizations in the fields of information technology, agriculture, industrial materials, biotechnology, forest products, healthy aging and manufacturing.

It was also a record year for new startup companies to license OSU technology. Among them were:

- » CSD Nano of Corvallis, which sells a high-performance coating to increase solar-cell performance
- » OilEx Tech of Monmouth, producer of a microwave oil extraction device
- » NW Medical Isotopes of Corvallis, which offers a domestic source of a medically critical isotope, molybdenum-99

Through the Oregon State University Advantage, OSU connects businesses with faculty expertise, student talent and world-class facilities, and helps bring ideas to market and launch companies. Among companies participating in the Advantage program are Blount Manufacturing, PCC Structural, NuScale Power and HP.

Oregon's Leading Public Research University

Oregon State University is ranked among the nation's best in forestry, geosciences, nuclear engineering, conservation biology, marine sciences and agriculture.

Researchers are tackling critical issues in public health, natural resources, business and energy. Their findings are leading to economic and social progress for Oregon and the world.

COMMUNITY RESILIENCE ON A CHANGING PLANET

Ocean Views

Technology extends our vision. As part of the National Science Foundation's Ocean Observatories Initiative, Oregon State oceanographers are deploying a moored sensor network and a fleet of underwater autonomous gliders in the Pacific Ocean off the West Coast this fall.

Carbon in the Forest

Pacific Northwest forests could significantly increase the amount of carbon they store — and thus keep out of the atmosphere — pending disturbances. But thinning to reduce crown fire risk and/or bioenergy production does not reduce greenhouse gas emissions. Oregon State researcher Beverly Law and her colleagues reached these conclusions by integrated analysis of remote sensing data, inventories and Earth system modeling of management strategies under future climate.

Wheat for the World

Northwest wheat growers have steadily increased production, contributing to Portland's status as the largest wheat exporting port in the nation. Oregon State wheat breeder Bob Zemetra exemplifies success in plant breeding and agricultural systems that enable Northwest farmers to feed millions. Wheat cultivars developed by OSU are the leading soft white winter varieties grown in Oregon and Washington.

PARTNERS IN HEALTH

Success at School

If you want to know if your kindergartener will succeed in school, look to Simon SAYS for an answer. Or the Head-Toes-Knees-Shoulders task. Megan McClelland, a specialist in early childhood development, has documented the effectiveness of games in preparing children for school and determining when they are ready. Higher scores are associated with better performance in reading, math and vocabulary in pre-school and kindergarten.

Fighting Cancer with Diet

If the secret to a healthy life is in the genes, then activating the right genes might help us ward off disease. Researchers in the Cancer Chemoprotection Program in Oregon State's Linus Pauling Institute, have found that compounds in some vegetables — broccoli, spinach, cauliflower, cabbage — can do just that. The implications could also be enormous for the prevention of heart disease, stroke and neurodegeneration.

Beneath the Skin

Our skin protects us, and in return, we soak it in sunlight, lather it with lotions and scrub it with soap. When trouble appears, the consequences range from uncomfortable to deadly. In the OSU College of Pharmacy, Arup and Gitali Indra study the interactions among skin cells that signal the risk of disease. Their research may lead to treatment for chronic conditions (eczema) and to early detection and prevention of melanoma.

EYE FOR BUSINESS

Sustainable Screens

Oregon State leads a partnership among universities, federal research labs and the electronics industry to reduce waste and energy demand while simultaneously ramping up the power of electronic devices. Chemist Doug Keszler and electrical engineer John Wager lead the Center for Sustainable Materials Chemistry. Two Oregon companies — Amorphyx and Inpria — have already emerged from their work.

Testing Our Metal

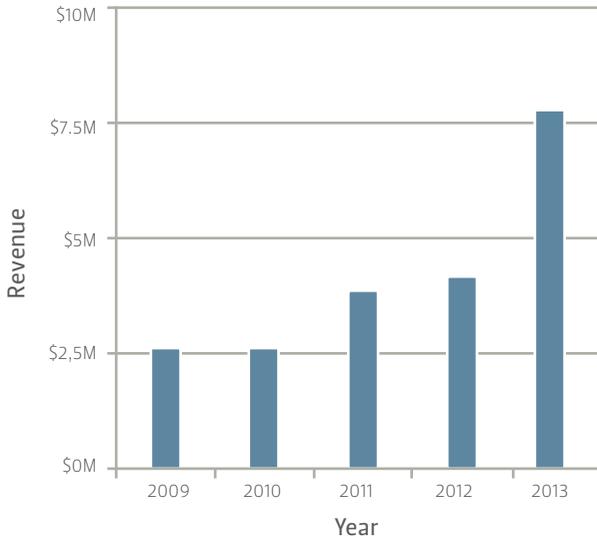
Chain saws, truck frames and jet engine parts. All from America's industrial heartland, right? Or made in China? Wrong. Companies that produce these and other metal products — from kitchen knives and laboratory incubators to steel fabrication stock — employ thousands of Oregonians. John Parmigiani, Oregon State engineer, conducts research to help these companies solve problems. Funded by industry and the state-financed Oregon Metals Initiative, Parmigiani's projects have led to jobs for students and skilled employees for businesses.

Seeing the Light

Oregon scientists and a startup company have joined forces to create the next generation of Low-E glass coating — an anti-reflective, thin film that blocks infrared heat (keeping heat inside during winter's cold and keeping heat outside during summer's sizzle) and allows more visible light to penetrate year-round. Chih-hung "Alex" Chang, Oregon State chemical engineer, and G. Z. Brown of the University of Oregon are working with a start up company, CSD Nano of Corvallis, on research, testing and product development.

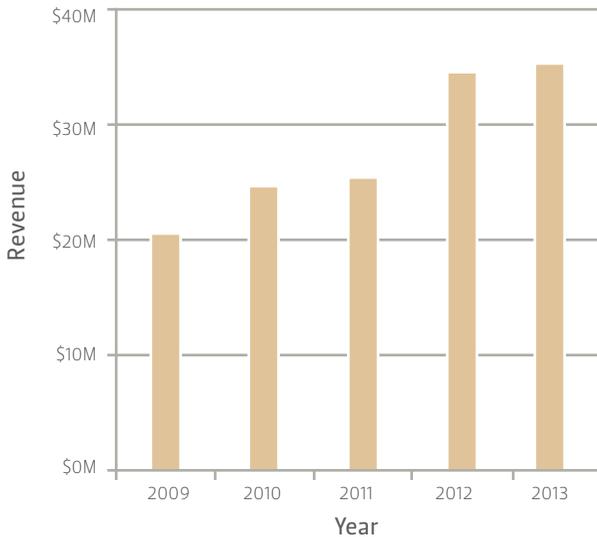
Research by the Numbers

Licensing Income



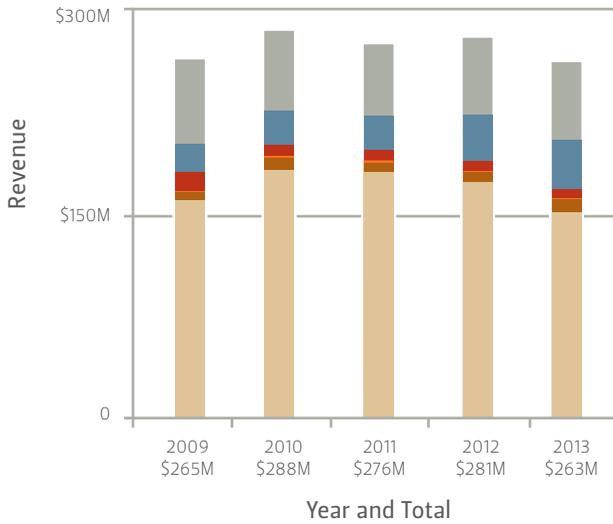
In fiscal year 2013, OSU signed a record 88 licenses. Licensing income has more than doubled since 2009 on an annual basis.

Industry Revenue



Contributing to nearly \$36 million in industry funding in FY 2013 were \$11.7 million for testing and \$7 million in sponsored contracts and agreements.

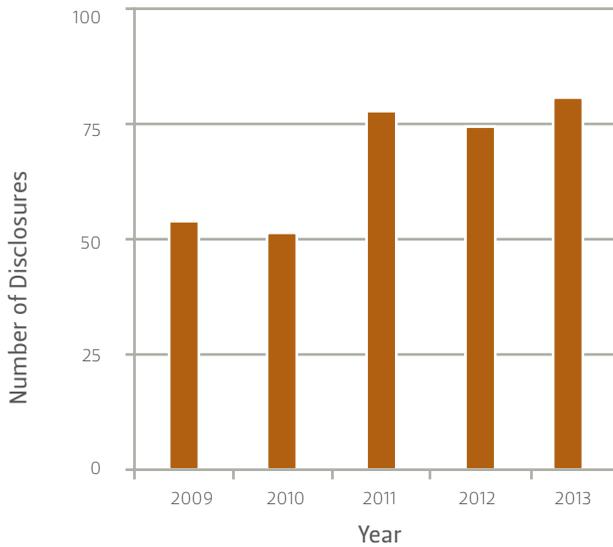
Awards by Sponsor Type



Competitive funds from federal agencies comprised 58 percent of OSU research funding. State and local funding grew to nearly \$8 million, a nearly 50 percent increase over FY 2012.

- Land-Grant Formula Funding
- Industry
- Non-Profit
- Foreign Government
- State/Local Government
- Federal Agencies

Invention Disclosures



Licensing innovation begins with an invention disclosure by a researcher. OSU recorded 80 disclosures in FY 2013 through the Office of Commercialization and Corporate Development.



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