

College of Agricultural Sciences

Oregon State University

September 2011

Introduction

The challenges of meeting food, fiber, energy, and water needs of a burgeoning global population on an ever-diminishing natural resource base are numerous and daunting. So, too, is there great challenge in enabling citizens, through education, to fully participate as contributing members of society.¹ The United States has made significant public investments in public institutions for public good in combination with policies enhancing trade and exchange of ideas. As a product of such investments in the Land Grant system, the OSU College of Agricultural Sciences plays a significant role in addressing many contemporary challenges. In this 2011 Report of the College of Agricultural Sciences to the Provost of Oregon State University (OSU), we will illustrate—through a selection of examples—our contributions toward solutions to current and future challenges while helping strengthen the social and economic constructs of communities we serve.

In surveying the College's programs and activities during the 2010-2011 academic year, one theme in particular emerged: that of collaboration. The College's faculty not only continued a tradition of collaborating across disciplinary and organizational lines, but have expanded collaborative work more broadly. In example after example in this report, collaboration underpins discovery and learning.

Key initiatives undertaken and noteworthy outcomes achieved

Student engagement and success

The College of Agricultural Sciences has set as a goal that all students in all majors gain practical experience through participation in experiential education activities such as internships, undergraduate research, international study or international internships, and service learning. The College develops contributing members of society by embracing hallmarks of quality education: technical and experiential skills; critical thinking, communication, and language skills; teamwork and problem-solving skills; professionalism; and the ability to live and work in a diverse society. Just a few of many possible examples follow.

Technical and experiential skills

The interface between humankind and the environment is the focus for students in the Department of Biological and Ecological Engineering, with ecology as their fundamental design paradigm. The department graduated its second ecological engineering cohort in 2011; only one other institution in the nation offers students a major in ecological engineering. The OSU program is expected to be accredited by the Accreditation Board for Engineering and Technology.

Two National Institutes of Health training grants, through the Department of Environmental and Molecular Toxicology, provide focused doctorate-level training. One grant enables training for doctors of veterinary medicine (or those with equivalent degrees) in novel uses of aquatic animal models for biomedical research. The second training grant is broader in scope and supports pre- and post-doctoral training in toxicology and environmental health sciences.

¹ Ramaswamy, S.B. 2010. Global challenges in the "new economy" and land grant universities of the 21st century as a model for research and education responses. http://agsci.oregonstate.edu/sites/default/files/about/Ramaswamy_new-economy.pdf

In a collaborative linkage between the colleges of Agricultural Sciences and Engineering, a group of students from the College of Engineering designed and built an innovative barley malter for their senior project. The malter now allows faculty in Agricultural Sciences to teach every step of the brewing process, from the barley field and hop yard to the bottling line. OSU's Food and Fermentation Science Club works in partnership with Block 15 Brewpub to make and distribute student recipes; the downtown Corvallis purveyor reports that student-created brews sell well.

Critical thinking, communication, and language skills

A new learning opportunity for undergraduate students in the colleges of Agricultural Sciences and Forestry will be made available in the coming fall quarter. A one-year, not-for-credit Leadership Academy will provide a structured framework to enhance leadership skills. Students participating in the Leadership Academy will critically evaluate their leadership skills, and identify areas for growth. Under faculty mentorship, they will create and pursue individualized plans for personal development, and select activities and coursework that contribute to their goals.

Teamwork and problem-solving skills

Another example of cross-college collaboration, also related to engineering and leadership, is a new special topics course, AREc 499: *Appraising Engineering Solutions for Oregon's Agriculture*. The course integrates students from Engineering and Agricultural and Resource Economics who are assessing the feasibility of incorporating radio frequency identification and barcode technologies as inventory tracking tools in ornamental nurseries. Engineering students will adapt hardware; Agribusiness Management students will assess potential for value to the industry.

In a contrasting team pursuit, OSU's intercollegiate Horse Show Association team continued its long-established reputation for excellence in western and hunt-seat riding. The team was judged this year's Western Team Reserve National Champion. OSU's team is one of two nationally that are not supported by the NCAA; the other 400 contenders have team sport status at their institutions. With Department of Animal Sciences faculty support, the team draws together 50 students from many OSU programs.

Professionalism

Clubs and organizations with a home in the College of Agricultural Sciences are among those most engaged in Associated Students of Oregon State University's (ASOSU) student leadership and involvement activities. The Agricultural Executive Council serves as a governing body for students and clubs within the College, representing more than 30 College organizations within ASOSU. Members of the Council are chosen by student peers to achieve student organizational goals of the College and its constituents, and to provide resources and opportunities to further an understanding of the diversity of agriculture. The Council promotes professional development among students, including sponsoring a grant-writing workshop, and creating networking tools for career advancement.

Other College organizations participate in service-learning projects that provide outreach and enhance students' experience of the campus community. Examples include participation in Earth Day, Teach for America, and the American Cancer Society's Relay for Life. As a fundraiser for Linn-Benton Food Share, the student organization Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS) partnered with Teach for America and ASOSU to present a night for social justice.

Ability to live and work in a diverse society

As the global community becomes increasingly interlinked, an understanding of "the other" becomes crucial to effective interaction. To support a broader array of students representing the sub-cultures of the American melting pot, the

College of Agricultural Sciences has received a second Multicultural Scholars Program grant of \$180,000. This USDA National Institute of Food and Agriculture (NIFA) funded program provides scholarships, paid internships, and research experience for six students from groups traditionally underrepresented in the food and agricultural sciences. These scholars will earn bachelors degrees in Bioresource Research and will participate in the OSU chapter of MANRRS. A similar grant funded students in 2009. Each of the 2009 multicultural scholars has been elected to fill an officer position in the OSU MANRRS chapter for the 2011-12 academic year. Each has participated in an internship opportunity related to personal career goals and interests. Two have been selected to serve as Ambassadors for Agriculture, Forestry, and Natural Resources for the coming academic year, and one multicultural scholar served in this role during the prior year. Two have participated in study abroad programs; all are involved in sponsored research activities.

Throughout the College, students increasingly demonstrate interest in study- and research-experience abroad. Once engaged internationally, many students create blogs to report on their experiences in real-time. Recent examples of blogging include international scholarship activities in Spain,² Bonaire,³ India,⁴ Honduras,⁵ Thailand,⁶ and New Zealand.⁷

In related international activity, College faculty, with colleagues at OSU and elsewhere, led a two-week undergraduate field hydrology course in Chile, with local expertise provided by Chilean scientists. This course was funded by a HydroGeoPhysics Travel Grant from the Consortium of Universities for the Advancement of Hydrologic Science, Inc. and the NSF Hydrologic Sciences Program. Its purpose was to advance undergraduate education and the scientific mission of OSU's Chilean project. Sixteen students, including representatives from Germany, Chile, and from universities across the United States, directly participated in geophysical field methods applications.

A USDA-International grant made possible nine weeks of classes and a two week internship for seven OSU students who spent the winter quarter studying in Chile and experiencing a language and cultural immersion. Faculty from the departments of Fisheries and Wildlife and Agricultural and Resource Economics accompanied the students.

The College continues to serve place-bound students globally, as evidenced by growth in Ecampus enrollment. Enrollment growth has exceeded 30 percent for the past two years for the nine College departments reaching distance students. Four undergraduate majors⁸ and three minors⁹ are offered, as is a graduate certificate in Fisheries Management. The Department of Fisheries and Wildlife has led the College in recruitment of online students.

Research and its impact

Researchers in the Department of Environmental and Molecular Toxicology are investigating the impact of man-made nanoparticles on cells. Working at the interface between research and policy, faculty have begun to contribute to an understanding of potential impacts of nanobased pesticides, a relatively new area within nanotechnology. While these applications may have positive impacts, such as more highly targeted applications with reduction in active ingredient loading, researchers are urging caution, because materials at the nanoscale interact differently with surfaces, including cellular surfaces.

² <http://blogs.oregonstate.edu/beav2011aggie/universidad-de-cantabria-santander/>

³ <http://blogs.oregonstate.edu/annaroseandthesea/>

⁴ <http://www.flickr.com/photos/46280876@N04/sets/72157623025183647/>

⁵ <http://oregonstate.edu/dept/ncs/lifeatosu/2010/osu-students-travel-to-honduras-to-provide-aid/>

⁶ <http://www.chemistry.ucsc.edu/projects/thaireu/>

⁷ <http://www.lincoln.ac.nz/Studying-at-Lincoln/>

⁸ Fisheries and Wildlife, General Agriculture, Horticulture, Environmental Economics and Policy.

⁹ Fisheries and Wildlife, Horticulture, and Resource Economics.

Faculty in the Department of Botany and Plant Pathology, working on the molecular biology of potyviruses and closteroviruses, have advanced the knowledge of the genomics of viruses and sub-cellular life forms, leading to better understanding of protein complexes and protein trafficking between cell compartments. This knowledge offers promise for the production of vaccines, other pharmaceuticals, and plant antibodies.

College researchers are using zebrafish as a model for mechanisms that trigger mental and physical diseases in humans and to understand the risks that chemicals, nanomaterials, and pharmaceuticals pose to human health. The fish share about 80 percent of their genes with those of humans. Their rapid maturation makes possible testing on a large number of subjects in a short time. The potential impacts of pesticide exposure on human embryos and how organisms regenerate tissue after injury are two of many lines of research being pursued.

Research and global issues

Climate change, energy security, water scarcity, competition for land, and demand for food are five long-term global resource scarcity issues identified by Alex Evans, a fellow with the Center for International Cooperation at New York University who heads that Center's program on resource scarcity, climate change, and multilateralism.¹⁰

Climate change

Researchers throughout the College are engaged in activity to document, predict, and respond to the threats global climate change presents to the human community. College research achievement was recognized by *ScienceWatch* of Thomson Reuters which ranked OSU fourth in its "U.S. Institutions: Most Prolific in Environment and Ecology, 2005-2009." We recount just a few examples here.

- Marine phytoplankton sequester significant amounts of carbon in the Earth's oceans and thus buffer global climate change. Fifty years of conventional wisdom about these ubiquitous single-celled organisms have been challenged by results developed in the Department of Botany and Plant Pathology. New views of the role played by marine phytoplankton raise concerns that global warming may curtail, rather than stimulate, ocean productivity.
- Department of Crop and Soil Science faculty are participating in a broad national collaboration to breed climate change-tolerant barley and wheat varieties. Targeted traits will include increased efficiencies in use of water and nitrogen, resistance to disease, and tolerance for low temperature. These efforts will expand the global range of these essential foodstuffs and are supported by a \$25 million grant awarded to participants in the national collaboration.
- Work assessing the viability of farming in the inland Pacific Northwest under various climate-change scenarios will better enable growers to respond effectively to climate change and to manage their carbon footprints. The project examines potential effects of climate change on cereal crops and aims to determine which farming methods may promote sustainability. Researchers in the College are contributing to the \$20 million grant-funded region-wide study.

Energy security

- With assistance from faculty in the Department of Animal Sciences, sixteen Oregon dairies are able or soon will be able to produce energy and reduce emissions. Faculty link developers with local dairy farmers, enabling adoption of a new generation of more efficient anaerobic digesters that extract 50 percent more energy from dairy waste, reduce greenhouse gases up to 50 percent, and reduce dairy-associated odors. An innovative partnership scheme relieves dairies of start-up investments, formerly a barrier to entry. The investment reaches a breakeven point sooner, increasing dairies' share in energy sales profits.

¹⁰ Evans, Alex. 2009. The feeding of the nine billion: Global food security for the 21st century. To find the document, go to this link and download the pdf: <http://www.chathamhouse.org/publications/papers/view/108957>

- Wastewater-to-electricity technology work continues in the Department of Biological and Ecological Engineering where researchers are optimizing a process first demonstrated more than two years ago. Current research seeks to identify optimal bacterial species for electricity production, to determine the effect of common pollutants found in wastewater on bacteria of interest, and to optimize technologies in use. This project offers the promise of decentralized power generation and advanced waste water treatment.

Water scarcity

- Collaborations across departments, colleges, and universities are at the heart of an NSF-funded project led by OSU's Institute for Water and Watersheds. Willamette Water 2100 brings together faculty from Agricultural Sciences and Forestry, among other OSU colleagues, for a comprehensive, highly integrated examination of hydrological, ecological, and socio-economic factors in the Willamette River Basin. The team is applying Envision, a theoretical framework developed at OSU, to evaluate how climate change, population growth, and economic growth may alter the availability and use of water in the Willamette River Basin during the next century. Its goals are to predict where climate change will create water scarcities and where those scarcities will exert the strongest impacts on basin residents.¹¹ Interdisciplinary relationships formed for this project are expected to endure and promote achievements in teaching, research, and Extension. Faculty from the College's departments of Biological and Ecological Engineering and Agricultural and Resource Economics are participants.
- Applied research from the Malheur Experiment Station has prompted the conversion from flood irrigation to drip irrigation on at least 25 percent of Oregon's onion acreage. The result is a 40 percent reduction in water and nitrogen fertilizer use. Coupled with precise irrigation scheduling, this practice has increased onion yield and quality.¹² Station faculty have been key players in enabling growers to effect the transition.

Competition for land

- An understanding of the economic efficiency and ecological impacts of development in areas of low-density population is the anticipated outcome of a theoretical model developed in the Department of Agricultural and Resource Economics. The model will provide a benchmark against which land use policies may be evaluated.¹³

Demand for food

- In a multi-state effort called the Northern Organic Variety Improvement Collaborative, faculty from the Department of Horticulture are collaborating with colleagues from three other universities, the Organic Seed Alliance, and organic farmers. This \$600,000 USDA-funded project will identify—or breed—vegetable varieties adapted to organic production systems. The project will increase availability of certified organic seed supplies, increasing the organic sector's compliance with National Organic Program regulations. It will also educate farmers on organic seed production and plant variety improvement.
- Those who manage food systems are acutely aware that food production is always at risk of a new threat whether that is an insect, a disease, or weeds. Sophisticated cross-disciplinary team science is required to monitor, detect, and address these pest threats. Collaborating broadly, College researchers and Extension faculty are leading a \$5.8 million multi-state applied research project for immediate control strategies for the spotted wing *Drosophila*, an introduced pest that infests ripening fruits. Fruit production in Washington, Oregon, and California (with handling and value-added activities) contributes billions of dollars in direct and indirect impacts to the states' economies. Through proactive collaborations, many of the same faculty are positioned to respond to the anticipated arrival of a pest that feeds on an array of crops, the brown marmorated stink bug.
- The first OSU-branded cheese to be released, a student-crafted product from the College's new Arbuthnot Dairy Center, signals the gain in prominence of Oregon's artisan cheese industry. A cheese label design and naming

¹¹ <http://water.oregonstate.edu/ww2100/>

¹² To access the full document, go to this link, and search for EM 8901:

<http://extension.oregonstate.edu/catalog/>

¹³ <http://purl.umn.edu/103641>

competition has enhanced student engagement and preparation for a growing industry. The Department of Food Science and Technology has benefitted by the recent endowment of a professorship made possible by Paul G. and Sandra A. Arbuthnot.¹⁴ The couple had life-long ties to Oregon's dairy industry.

- Legislative action led to the tenure-track hire of a honeybee specialist within the Department of Horticulture to ensure the health of honey bees, crucial pollinators for many crops. An on-campus diagnostic Honey Bee Laboratory makes it possible to examine thousands of bees for a variety of diseases and parasites; beekeepers can quickly access research-based guidelines to promote and maintain the health of their hives. Work from this lab is estimated to save Oregon's beekeepers \$1.4 million annually in hive medication costs. The farm-gate value of bee pollination to Oregon has been estimated at \$460 million.
- According to the United Nations' Food and Agriculture Organization, as much as one-third of food produced for human consumption is lost or wasted: fruits and vegetables are the food category most impacted.¹⁵ An edible coating developed in the Department of Food Science and Technology slows deterioration of fresh blueberries, increasing market value and creating possibilities for a new market sector in pre-washed, ready-to-eat fruit. Use of the coating with other fresh fruits is under investigation.

Outreach and engagement including international-level activities

Researchers throughout the College participate in international efforts to solve problems of global significance, such as those recounted here.

In a major collaboration among the International Whaling Commission, the International Union for Conservation of Nature, the A.N. Severtsov Institute of Ecology and Evolution within the Russian Academy of Sciences, and the College's Marine Mammal Institute, a team of scientists from Russia and the United States has successfully tagged and is tracking by satellite a western gray whale off the coast of Russia's Sakhalin Island. The effort has attracted worldwide media coverage. Although the whales' feeding grounds in the Russian Far East are known, details of their migration routes and breeding grounds are not. Such knowledge may contribute to conservation of this most-endangered whale population

Department of Fisheries and Wildlife research faculty have completed a seventh year of participation in the Grouper Moon project in the British West Indies. The focus of the project, funded by the Reef Environmental Education Project and the Cayman Islands Department of the Environment, is the spawning aggregations of Nassau grouper (*Epinephelus striatus*), a top-level predator that plays a role in structuring Caribbean reef communities. The majority of Caribbean reefs are under one or more threats to survival.

Another example brings together College faculty and their international partners who are working to solve potential food quantity and quality concerns, as well as closely related water quality issues. Researchers from the College's Integrated Plant Protection Center and the Department of Environmental and Molecular Toxicology continue their partnership with colleagues in West Africa on a pesticide risk assessment and management program in West Africa. The project focuses on integrated pest and production management, climate and weather-based pest risk assessment, biological pest control, sustainable agrochemical use, and food security. It is supported by more than \$5.9 million of funding from the USDA, the United Nations Food and Agriculture Organization, and others.

¹⁴ <http://extension.oregonstate.edu/news/release/2010/12/portland-couple-endows-osu-dairy-professorship>

¹⁵ <http://www.fao.org/news/story/en/item/74192/icode/>

In other outreach efforts, for College faculty with Extension appointments, blogging abounds as a means of informing stakeholders.¹⁶ Increasingly, Twitter posts relay urgent pest updates.¹⁷ “Ask an Expert”¹⁸ now allows stakeholders to communicate with Extension faculty via the internet rather than the more traditional telephone call or office visit. Beginning in 2011, an online PNW Weed Management Handbook will be updated quarterly, rather than annually, and its in-depth weed management guidance can be found on a website designed for ease of use.¹⁹ This online Weed Handbook, a product of tri-state collaboration, serves as a prototype for its companion PNW Insect and Disease Handbooks; these complex documents are adapted to internet publication.

Other examples of adaptation to an information culture worthy of mention:

- In a shift from OSU Extension’s long-time reliance on print publications and on-line versions of printed information, Extension this year released the first peer-reviewed learning module to achieve the same professional-level status as print materials. A learning module about wine grape nutrition was created using software designed for the needs of online learners.²⁰
- *eXtension* is a nationwide internet-based collaborative environment enabling Land Grant University faculty to create communities of practice and to exchange research-based data in real time—and make it available to the public. Since 2007, the College’s Department of Horticulture has hosted an eOrganic Workgroup that supports researchers internationally in collaborative publication activity. With leaders from eOrganic communities of practice throughout the nation, Department of Horticulture faculty and staff worked with USDA-NIFA to ensure proposals were allowed to include support for eOrganic and eXtension.²¹ A recent round of submissions to NIFA included twenty proposals with budget line-items for eOrganic core services.

More traditional outreach methods continue to distinguish the University as well. A seasonal field position through the Oregon Department of Fish and Wildlife to monitor sage grouse habitat was a direct outcome of Extension programming for ranchers in Lake and Harney counties. The sage grouse is eligible for listing under the endangered species act and habitat monitoring is essential for informed assessment of the situation. Another endangered species, the gray wolf, has been delisted for the eastern third of the state. There, Extension field faculty have provided research-based information to inform a potentially contentious issue.

Oregon’s nurseries produce millions of trees, shrubs, and other plants, and inventory control is critical. Counting by hand is labor-intensive and expensive. Another creative adaption by research and Extension faculty is the use of drone-mounted cameras. Aerial images are downloaded to software that, in its simplest application, identifies and counts plants. Equipped with sensors, the device potentially can detect disease, identify irrigation or fertilizer problems, gauge plant size, and predict crop yield—and even spot where a field fence needs repair. This work is a collaboration between Department of Horticulture faculty at the North Willamette Research and Extension Center and J. Frank Schmidt & Son, a major producer of shade trees based in Boring, Oregon. Schmidt & Son provided initial funding that supports a multi-state team of agricultural researchers. The drone is quick, nimble, and far more stable than fixed-wing craft; its price is within reach of many nursery operations.

¹⁶ <http://blogs.oregonstate.edu/deliciousnessw09/>; <http://blogs.oregonstate.edu/coarcbulter/>; <http://blogs.oregonstate.edu/seedproduction/>; <http://blogs.oregonstate.edu/bomingsblog/>; <http://oregonstate.edu/dept/NWREC/blog.php?dir=126>

¹⁷ <http://extension.oregonstate.edu/news/release/2009/06/osu-researchers-use-twitter-field>

¹⁸ <http://extension.oregonstate.edu/extension-ask-an-expert>

¹⁹ <http://pnwhandbooks.org/weed/>

²⁰ To access the full document, go to this link, and search for EM 9024: <http://extension.oregonstate.edu/catalog/>

²¹ <http://about.extension.org/>

The dream of an Oregon Wine Research Institute has become reality with the hiring of a director and the staffing of the Institute office. The Institute combines efforts in grape production, wine making, and business management for the Oregon wine industry into a cohesive collaboration between the College and the industry. A technical advisory committee has been selected, research priorities have been developed, and strategic planning is underway. Two researcher hires have been initiated, one for campus and one for Southern Oregon Research and Extension Center, with the latter complete.

The OSU's Small Farms Program continues to respond to needs of a formerly underserved, largely unrecognized but significant population. The 11th annual conference attracted more than 600 participants, making it the largest single event in the state for any of Extension's six program areas. This program has attracted federal grant dollars, such as a Risk Management Education grant that funded a two-day, niche meat marketing short course held with this year's conference. A \$680,000 USDA-NIFA Beginning Farmers and Ranchers grant is making possible the adaptation of a highly successful Growing Farms curriculum for internet distribution. When released next year, it will be the only on-line curriculum available for this audience that is adapted to conditions in the western United States.

In 2011, the College repeats its participation at the Oregon State Fair. Researchers showcase real life applications of their outputs in a setting appealing to a diverse demographic. The faculty provide information about the University, connect individuals with College experts for specific problem solving, and engage in one-on-one conversations with Oregonians.

Community and diversity enhancement initiatives

As part of a Land Grant institution, the College of Agricultural Sciences seeks to actively engage in substantive societal issues that affect our ability to address global challenges. In the next 30 years, 20 percent of the U.S. population will be individuals of Hispanic descent; thus, the College is part of the University's planning for a concomitant increase in Hispanic student enrollment. The following are a few examples of efforts to promote community and diversity within the College and the University.

- The University's Minorities in Agriculture, Natural Resources, and Related Sciences chapter is collaborative with the College of Forestry. The OSU chapter received the College of Agricultural Sciences' Club of the Year award and, for the second time, was recognized at the MANRRS national convention as the National Chapter of the Year.
- Arlyn Yire Moreno Luna received the Meso American Student Association (MASA) award for minority pride at *Noche de Gala*. Arlyn is a senior from Roseburg majoring in Bioresource Research. She is program chair for the first *Mi Familia* weekend event scheduled for 2012. This event will engage members of families who typically do not attend OSU's Mom's Weekend or Dad's Weekend activities.²²
- Service learning, applied horticulture, and marketing are integral to experiential learning for students in the Department of Horticulture and for community building more widely. Engagement is the key to success for the OSU's Organic Growers' Club (OGC), now in its 11th season. OGC has 600 students on its listserv, and engages 15 to 30 students at weekly work sessions year round. Under Department of Crop and Soil Science faculty guidance, the group farms 3.5 acres at the OSU Veg Farm, and additional land at the Oak Creek Center for Urban Horticulture (OCCUH). A vegetable stand and walk-in cooler are under construction at OCCUH. The OGC piloted a 15-member subscription farm, with expansion planned for 2012. The club funds seven 100-hour internships.
- The College has created a "Demographics Task Force" comprising faculty, staff, students, and external stakeholders. The charge to the task force is to craft a vision and path forward to accommodate the demographic changes occurring

²² <http://agsci.oregonstate.edu/brr/msp/mentors>

in Oregon, which will result, in just a few years, in one out of four students coming to OSU being of Hispanic origin, and likely be first in their families to attend college as children of documented or undocumented laborers in the food, agricultural, forestry, and natural resources endeavors. Additionally the expectation is to develop a framework that offers Hispanic, Native American, and other students from disadvantaged backgrounds a welcoming and enabling educational environment. The task force is to present its report to the dean by December 2011. It will be executed beginning in mid-January 2012.

- A task force on international programs recently recommended more comprehensive and systematic development of the College's international discovery, learning, and engagement programs in the food, agricultural, and natural resource sciences. Associate Dean Cary Green maintains overall responsibility for the student experience in the College of Agricultural Sciences and will lead the new Office of Academic and International Programs within the College. The vision for these programs is to enable greater prominence in international discovery, learning, and engagement, and to enhance student involvement in international activities.

Other initiatives

With the submission of a Category I proposal to merge the departments of Crop and Soil Science and Horticulture, a new School of Integrated Plant, Soil, and Insect Science is advancing toward completion. The proposal is the product of an extensive process for faculty engagement in the design of the new organization. To ensure effective communication within this unusually large and distributed unit, the new school is collaborating with the University to deploy shared digital technology and communication tools.

Merger of the departments of Rangeland Ecology and Management and Animal Sciences is proceeding according to schedule. The new name will be Department of Animal and Rangeland Sciences. Faculty and stakeholders contributed significantly to a strategic plan for the combined department, which have been reviewed externally by USDA-NIFA and internally by the Graduate School. Information garnered in the reviews was used to develop a Category I proposal that has been submitted. In addition, John Killefer will begin duties August 31, 2011, as department head for the combined unit.

Status of key initiatives undertaken

Areas for improvement

Much is being asked of academic faculty: accept increased teaching loads and larger classes, seek more grants, engage in more interdisciplinary work, and accommodate reduced staff support. A Blue Ribbon faculty panel commissioned by the College in 2009 had two overriding recommendations: (1) Do no harm (don't fix what's not broken; don't impair a top-ranked college containing five top-ten ranked departments nationally); and (2) ***The biggest faculty need is more "enabling support," not less.*** Now that increased enrollment and higher tuition have generated cash flow for the University, some recurring resources should be dedicated to "enabling support" for faculty including, but going beyond, allocation of new faculty lines and work on deferred maintenance. Consideration should be given to ensure that faculty have adequate support staff available to assist them. It is especially important to ensure adequate help with contract and grant preparation, submission, and post-award management; the provision of 21st century facilities and services including information technology and suitable scientific "commons," and ensuring standard procedures for supporting interdisciplinary efforts including appropriate data and information systems in order to acknowledge and give credit for team efforts and for cross-departmental teaching.

Major barriers

- Challenge of retaining renowned faculty in an environment of competitive offers.
- Challenge of conducting world-class 21st century research in 19th and 20th century facilities.

Major faculty and student awards

Please see Appendix 1.

Initiatives to leverage resources and introduce efficiencies

Principal base resources for the College of Agricultural Sciences are those state funds directed to the Oregon Agricultural Experiment Station for its research mission and to the Agricultural Sciences and Natural Resources Extension Program through the OSU Extension Service. Secondary base resources are federal formula funds (e.g. Hatch and Smith-Lever). State support for the Experiment Station and Extension has declined on the order of 25 percent over the past three years. Similarly, Hatch and Smith-Lever funds also are expected to decline in the coming federal fiscal year. These declines further underscore the need to seek extramural grants and contracts—as well as private support—to supplement and enhance base funding. One of the Experiment Station’s state performance metrics is external funds leveraged per dollar of state funding. In the 2010-2011, this metric set a new record of 1 to 2.5 as \$24.5 million in state appropriations were leveraged by faculty to generate \$61.4 million in external fund expenditures.

The vast majority of these external funds come from federal sources, in particular, from competitive grants. Maintaining this level of leveraging into the future will be difficult, given the federal fiscal outlook. More than \$2 million in USDA Special Research Grants to OSU through the Experiment Station were eliminated this current year; in current budget talks at the federal level, the USDA National Institute for Food and Agriculture has been targeted for a nearly 17 percent reduction. Other major research funding agencies (e.g. National Institutes of Health, National Science Foundation) also are expecting significant reductions. It is important to note that external grants are leveraged by tenured and tenure-track faculty paid primarily from *base funds*. As our *base funds* decline, our tenured and tenure-track faculty numbers also decline, thereby reducing capacity to attract extramural funds.

In an effort to ensure that valued research continues at branch experiment stations, the College has asked stakeholders for each branch station to contribute 25 percent of the unit’s base budget. The rationale for the existing set of eleven branch stations (fifteen locations) of the Oregon Agricultural Experiment Station is that they are located in *unique agro-climatic* or *economic zones* and, thus, that they create value by serving *unique local needs*. If this premise is valid, then one would expect there will be local support to help maintain the stations or, conversely, if the premise is not valid, then it is difficult to justify the continued expenditure from a shrinking pool of state funds. Work on this policy change continues and has accelerated, requiring considerable attention from the local branch station administrators.

As part of its mission, the College maintains, manages, and carries out plant research and teaching at six farms near Corvallis. Until now, individual farms, vineyards, orchards, and other research properties²³ were operated by the organizational units to which they were most closely related. As part of its continuing commitment to efficiency and effectiveness, the College has adopted a farm advisory committee recommendation to consolidate management of these farms, and to coordinate their operations, maintenance, and research support. The College has named a leader for the combined Plant Research Facilities; new, combined operations are underway.

²³ Botany and Plant Pathology Farm, Hyslop Farm, Lewis-Brown Farm, Schmitt Farms, Vegetable Farm, and Woodhall vineyard.

In yet another collaboration, the College of Agricultural Sciences partnered with OSU's Media Services unit to refurbish a dilapidated former classroom space in Kidder Hall into a state-of-the-art digital videoconferencing center and faculty training facility. The Kidder 202 facility is in regular use by the College for its statewide meetings, for training faculty from throughout the University to use electronic teaching tools being added to classrooms throughout the University, and for other University and state agency teleconferences and meetings.

The Agricultural Sciences and Marine Sciences Business Center (AMBC) integrates finance, accounting, and human resources support functions for the College of Agricultural Sciences and the OSU Hatfield Marine Science Center at Newport Oregon. AMBC was launched successfully on August 1, 2010. To enhance efficiency, a process was implemented to transfer documents electronically, reducing paper document handling, postage, and length of time for payment.

As an investment in the leveraging of resources, the College is in the process of hiring a sponsored research administrator and the AMBC reclassified a position to grant coordinator (the first such position at OSU). These individuals will provide comprehensive support for principal investigators and reduce administrative burdens on research faculty during the grant submission process. At the University level, grant submissions increasingly are supported by the adoption of an electronic proposal submission system called Cayuse. Faculty in the departments of Environmental and Molecular Toxicology and Botany and Plant Pathology are beta testers for this new system.

The College has been intentional in identifying and pursuing potential corporate partnerships. By mapping faculty expertise and interests against specific emerging corporate needs, on-campus face-to-face meetings with corporate representatives have been efficient and productive. Dow AgroSciences and ConAgra each have been attracted to providing opportunities for experiential learning for College undergraduates in their laboratories. In addition, material transfer agreements are in preparation for soybean and wheat variety germplasm.

The College's development efforts, "Enabling Student Success and Faculty Excellence," have resulted in securing more than \$6 million in gifts, pledges and private grants during FY 2010-2011. Some \$3.5 million of those funds were dedicated to scholarships, fellowships, faculty positions, student and faculty awards, and other programmatic support.

Construction is underway for a \$10 million teaching and research pavilion for the Department of Animal and Rangeland Sciences, made possible with private gifts and legislative funding. The 10,000-square-foot Animal Sciences Research and Education Pavilion will house classroom and laboratory space, a conference room, and barns. It will provide a central location for students who previously had to travel among various off-campus farms to study animal species. Also on site and part of the facility is OSU's second telecommunications support center. The new pavilion is expected to be ready for occupancy by the fall of 2012.

Performance metrics

Performance metrics will be added to this report when they are available from the Office of Institutional Research.

Appendix 1: Major faculty and student awards

Faculty

- Bob Anthony, Department of Fisheries and Wildlife, was named fellow of The Wildlife Society.
- Dan Ball, Department of Crop and Soil Science, was named a fellow of the Western Society of Weed Science.
- C. Scott Baker, Marine Mammal Institute, was named a Pew Fellow in Marine Conservation
- Lynda Ciuffetti, Department of Botany and Plant Pathology, was named a fellow of the American Phytopathological Society.
- Valerian Dolja, Department of Botany and Plant Pathology, received the Ruth Allen Award from the American Phytopathological Society.
- Dan Edge, Department of Fisheries and Wildlife, has been named a fellow of The Wildlife Society.
- Sue Haig, Department of Fisheries and Wildlife, received the Cooper Ornithological Society's 2011 Loye and Alden Miller Research Award, given for lifetime achievement in ornithological research.
- Stacey Harper, Department of Environmental and Molecular Toxicology, received the National Institutes of Health Outstanding New Environmental Scientist investigator Award
- Sue Haig, Department of Fisheries and Wildlife, received the Cooper Ornithological Society's 2011 Loye and Alden Miller Research Award, given for lifetime achievement in ornithological research.
- Hong Liu, Department of Biological and Ecological Engineering, received the Career Award from the National Science Foundation.
- Gopinath Munisamy, Department of Agricultural and Resource Economics, was elected chair of the International Agricultural Trade Research Consortium.
- Jay Noller, Department of Crop and Soil Science, was recognized as a finalist for his submission *Salmon-colored soil under coastal forest* in the 2010 International Science and Engineering Visualization Challenge by the National Science Foundation and the journal *Science*.
- Jeff Stone, Department of Botany and Plant Pathology, was the recipient of the Distinguished Professor Award from the Agricultural Executive Council.
- Sujaya Rao, Department of Crop and Soil Science, received the Distinguished Achievement Award in Teaching from the Entomological Society of America.
- Dana Sanchez, Department of Fisheries and Wildlife, delivered an invited paper as part of the plenary panel at the 2010 annual meeting of The Wildlife Society.
- Robert L. Tanguay, Department of Environmental and Molecular Toxicology, received a National Institutes of Health Infrastructure Award for innovative use of robots for biomedical research. Tanguay also was named distinguished professor by Oregon State University; he is one of the youngest faculty ever to have received this distinction.
- Greg Thompson, Department of Agricultural Education and General Agriculture, was elected president of the American Association for Agricultural Education.
- Desiree Tullos, Department of Biological and Ecological Engineering, received the Career Award from the National Science Foundation.
- Thomas Wolpert, Department of Botany and Plant Pathology, was named a fellow of the American Phytopathological Society.
- The Hermiston Agricultural Research and Extension Center potato tuberworm team was awarded the Pacific Branch Entomological Society of America Team Award.
- The North Willamette Research and Extension Center nursery team was awarded the Oregon Association of Nurseries' 2010 Distinguished Education Award for excellence in educational programs to the nursery industry. Team members are Judy Kowalski, Chal Landgren, Jim Owen, Rich Regan, Robin Rosetta, Luisa Santamaria, Clark Seavert, and Heather Stoven.

Student

- Patty Aron, Department of Food Science and Technology, was the 2010 graduate recipient of the Campbell's Excellence in Leadership Award through the Institute of Food Technologists.
- Andrea Bouma, Department of Food Science and Technology, was the 2010 undergraduate recipient of the Campbell's Excellence in Leadership Award through the Institute of Food Technologists.
- Whit Bronaugh, Department of Fisheries and Wildlife, is this year's recipient of the Oregon American Fisheries Society Carl Bond Memorial Scholarship
- Sean Carigg, Bioresource Research Program, is one of eight U.S. students selected to participate in an NSF-funded research experience in Thailand for undergraduates in organic chemistry.
- Megan Cook, graduate student in Fisheries and Wildlife, has received a Presidential Management Fellowship to be assistant to the U.S. Fish and Wildlife Service Science Adviser in Washington D.C
- Greg Fisher, Honors College, received an Honors Experience Scholarship to work with Brian Sidlauskas in the fish collection
- Amanda Gladics, Department of Fisheries and Wildlife, won best presentation award, Fisheries and Wildlife, at the HMSC Markham Symposium.
- Julia McGonigle, Department of Botany and Plant Pathology, was accepted into NASA's six-week Student Airborne Research Program, where she will gain hands-on research experience using NASA's DC-8 airborne science laboratory.
- Brooke Penaluna, graduate student Fisheries and Wildlife, received an EPA STAR grant.
- Anneke Tucker, Bioresource Research Program, was named overall winner of the second annual international Journal of Young Investigators Virtual Poster Session competition for her video presentation on the *Inhibition of α -Amylase and α -Glucosidase Activity by Bioflavonoids: Implications for Carbohydrate Metabolism and Type-2 Diabetes Mellitus*.
- Ankita Juneja, Bioresource Research Program, was awarded first place in the Graduate Research Poster Contest at the 26th Annual MANRRS National Career Fair and Training Conference for her poster *Iron impregnated biochar as a catalyst for decomposition of toluene*.
- Smit Vasquez-Caballero, Bioresource Research Program, was awarded first place graduate Social Sciences and Business Poster at the 26th Annual MANRRS National Career Fair and Training Conference for his poster *Farm and non-farm level economic impact of migration to USA in rural Mexico*.