

# College of Agricultural Sciences

*Oregon State University*

*August 2009*

## Introduction

The College of Agricultural Sciences is a large, multi-faceted unit of Oregon State University. In addition to enrolling 1165 undergraduate and 273 graduate students, its faculty attract research grants that constitute a large share of the University's overall research enterprise, and its Extension Agricultural Sciences and Natural Resources Program comprises almost half the programs offered by the OSU Extension Service. Given this scope of the College, we make no attempt to provide *comprehensive* documentation of the many activities and accomplishments of our faculty, staff, and students. Instead, in each of several categories specified by the provost, we offer examples of the work going on and its consequences for students, stakeholders, Oregon residents, and others. Because so much of the College's work is long-term, any report like this is necessarily a snapshot at a point in time. Some programs we report here were part of last year's report and may well be a part of next year's as well.

The section on student engagement and success discusses a new, College-wide, future-oriented Teaching and Learning Initiative. Subsequent sections on research and on outreach and engagement are for the first time this year organized around the University's strategic emphases of "healthy planet, healthy people, healthy economies"—all areas of significant contribution by the College of Agricultural Sciences. The report then addresses community and diversity, international activities, what we have learned through our operations, and major recognition and awards.

## 2008-2009 highlights

### **Sonny Ramaswamy named dean of the College of Agricultural Sciences and director of Oregon Agricultural Experiment Station**

**Sonny Ramaswamy**, former director of agricultural research programs and associate dean of the College of Agriculture at Purdue University, joins Oregon State University on August 1, 2009, as dean of the College of Agricultural Sciences and director of the Oregon Agricultural Experiment Station. In his new role, Ramaswamy will lead Oregon's largest agricultural research enterprise and one of OSU's largest colleges. **Thayne Dutson** retired from these responsibilities in June 2008. The College's executive associate dean, **Bill Boggess**, served as interim dean, and **Roy Arnold**, emeritus provost and OSU executive vice president, and the College's former dean and former executive associate dean, served in the interim once again as executive associate dean.

### ***Programmatic achievements***

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#### **Student engagement and success: the Teaching and Learning Initiative**

The College of Agricultural Sciences at Oregon State University is embarking on a comprehensive renovation of its offerings in academic programs and student experiences; we call this renovation effort the "Teaching and Learning Initiative" (TLI). The Initiative is being

undertaken in a time of economic hardship unseen since the Great Depression, and with intense constraints on University resources.

Although the current challenging economic environment will drive short-term actions, the Initiative's larger purpose is to provide an academic framework that will serve our students well into the future. The Initiative is guided by a committee of faculty and staff, with leadership from Assistant Dean **Cary Green**. Informing the committee's work are academic perspectives on curriculum and pedagogy from the National Academy of Sciences, the Association of Public and Land-Grant Universities, the National Survey for Student Engagement, and a review of the literature of pedagogic best practices.

The outcome of the Initiative will be a contemporary curriculum informed by best practices in pedagogy and student engagement. We will actively engage students, faculty, employers, and other stakeholders throughout the process. Our programs will be aligned with national efforts to advance teaching in higher education in general and in education for agriculture, food systems, and natural resources, in particular. Furthermore, our programs will be consistent with ongoing efforts in student success and engagement at OSU. Finally, our curricula will be infused with opportunities for students to develop leadership, entrepreneurialism, teamwork, communication, and critical thinking skills.

Work of the University's Council for Student Engagement and Experience (UCSEE) is directly relevant to the College's Teaching and Learning Initiative, helping shape our establishment of cohesive learning and engagement opportunities for undergraduates from the first term through graduation. In three phases, we expect to embrace the UCSEE's two foundational themes: intentionality around student transition to OSU and engaged learning experiences for students throughout their undergraduate program. The first phase comprises the first year with a goal of engaging students and aiding them in their transition to a major research university. The second phase centers on enrichment by moving students from thinking in terms of self to thinking in terms of community and global perspectives. The third phase is a culminating capstone experience.

### ***Unit-initiated teaching and learning innovations serve students, industry, and stakeholders***

#### **Refocusing the Fisheries and Wildlife undergraduate program**

The Department of Fisheries and Wildlife has completed a two-year effort to re-engineer its undergraduate degree. The process relied heavily on five years' of learner outcome assessment data, feedback from employers and clientele, and a survey of department graduates conducted every three years. The information suggested that a more focused effort on math, writing, and critical thinking skills and greater rigor in some basic sciences would improve an already outstanding degree program. The new curriculum integrates math and writing throughout, requires additional basic science courses, includes a new two-term capstone sequence focusing on critical thinking and team and leadership skills. The degree retains a highly successful internship and self-designed specialization components of the previous degree. Students will start the new curriculum in fall 2009.

The department will also begin offering its bachelor of science degree online fall term, 2009. The department has been a leader on campus in developing distance education courses for almost 15 years and now has 23 undergraduate courses offered two or more terms for distance learners.

Over the next two years, departmental faculty plan to develop another 13 courses for distance delivery, including the capstone courses, so students may graduate with the eCampus degree at the end of spring term, 2011. Based on enrollment in the Natural Resources and Environmental Science online degree programs, the department anticipates an enrollment of more than 100 students within three years.

#### **Teaching with exemplary methods for laudable outcomes**

The College of Education completed two institutional accreditation visits during the past year. In reporting, the review teams said they were impressed with OSU teacher preparation, and noted that, "Agricultural Education is an exemplar program to follow," citing in particular a system of data collection and analysis that other programs could use as a model. Accreditation team members recognized the **Department of Agricultural Education and General Agriculture** for setting the standard for excellence in teacher education.

The Council of Graduate Schools, whose mission is to improve and advance graduate education in order to ensure the vitality of intellectual discovery, specifically brought to the attention of its members the Professional Science Masters program at OSU, for tracking alumni and posting their profiles online. Since its inception in 2001, this respected program has been a joint effort of the colleges of Agricultural Sciences and Science.

#### **Teaching through undergraduate research experience**

The College's faculty continue to make contributions to the training of undergraduates by including them in research programs. This activity ranges from supervision of independent study during the academic year to the funding of summer internships. In the summer of 2008, Agricultural Sciences faculty supervised 18 of 51 undergraduates who were mentored through the **OSU Howard Hughes Medical Institute** program. Students spent eleven weeks conducting research and then reported on that experience in formal presentations at summer's end.

A new program, developed by **Jeff Chang, Department of Botany and Plant Pathology**, attracts second-term biology students into research. Chang has advised and helped identify research opportunities in the biological sciences for some 60 outstanding students. Most will conduct research for 2-3 years, a significant training experience, promoting successful careers and placement in higher degree granting programs. Chang also is the faculty adviser to Bio-PUG, a biology-based programming club for students. He initiated Bio-PUG to foster a network of students who would then be enabled to use programming in their research. Together members learn and mentor programming. Club activities center on student research projects. Through participation in Bio-PUG, students develop skills important for success in quantitative biology.

#### **Adding a therapeutic horticulture option**

The Department of Horticulture added a transcript-visible option to its bachelors degree in horticulture. Called therapeutic horticulture, this is the only such degree option of its kind on the West Coast; it fills an important and growing demand. The option combines courses in psychology, sociology, and health with courses in horticulture. Students acquire skills and knowledge needed to become specially educated and trained members of rehabilitation teams, and will be eligible for registration by the American Horticultural Therapy Association. Students learn to design garden spaces that accommodate people with a wide range of abilities and to assist people with physical, emotional, or mental disabilities in gaining skills, adaptations, and coping methods to enhance their lives. Plans for recruitment activities have been drafted.

The option is a collaborative effort among the College of Agricultural Sciences, the College of Liberal Arts, Portland Community College, and Legacy Emanuel Hospital.

### **Funding the traditionally underserved student**

Six students enrolling in fall 2009 will receive prestigious Multicultural Scholars Program (MSP) full-tuition scholarships to enter the BioResource Research (BRR) interdisciplinary sciences major at OSU. At the same time, a cohort of upper-division undergraduates also will receive scholarships and will be MSP Mentors and MSP Associates.

The Multicultural Scholars Program (MSP) serves students who are members of groups traditionally underrepresented in the food technology and the agricultural sciences, or who are first-generation college students, seeking research experience, professional development, solid mentoring relationships, and a relevant college education leading to a productive career or an advanced degree. As BRR majors, these students choose from among 12 degree options, and earn 14 research and 4 thesis credits. Students gain insight into the research planning process as they design and carry out an option-related research project. They develop self-confidence as they apply academic knowledge and in following a research project from inception to completion. Students become familiar with the literature of their option areas and gain experience in laboratory techniques and trouble-shooting skills. Many students report that this experience is instrumental in their decision to continue their studies at the graduate level or to seek a research-related career. The pairing of students with mentors is crucial to their success, as many have few role models for entering higher education. Oregon is widely represented, geographically, in the entering cohort, and one member will come from as far away as Texas to participate in this undergraduate research major based in the College of Agricultural Sciences. For 15 years, the BioResource Research (BRR) major has matched talented science students with faculty research mentors in seven OSU colleges including Agricultural Sciences, Science, Engineering, Oceanic and Atmospheric Sciences, Pharmacy, Forestry, and Veterinary Medicine. Students in BRR receive outstanding career preparation; all of its graduates have secured employment or have advanced to graduate or professional schools within three months of graduation.

MSP grant principal investigator **Larry Curtis**, associate dean in the College of Agricultural Sciences, said he believes OSU MSP has a high likelihood of success in producing outstanding graduates. Curtis and a talented team established the MSP, including **Kate Field, BRR director; Wanda Crannell, MANNRS advisor; Eda Davis-Lowe, director of The SMILE Program; Dave Stone, director of the National Pesticide Information Center (NPIC); and Cary Green, assistant dean and head advisor in College of Agricultural Sciences.**

### **Supporting relevant K-12 classroom experiences**

A joint project of the Oregon Agricultural Education Foundation and the **Department of Agricultural Education and General Agriculture**, the **Summer Ag Institute (SAI)** is a three-credit, week-long, graduate-level class coordinated and taught by the department's faculty. The institute targets K-12 teachers with little or no background in agriculture. Its goal is to support educators in using agriculture to teach science, math, social studies, and language arts. Current, factual, and scientific information about agriculture is presented, and participants are provided with materials to incorporate what they've learned into lesson plans. These more agriculturally literate participants can introduce their students to what they themselves have learned by making lessons more real and relevant. The action-packed week includes field trips to farms and ranches, tours of processing plants, and lectures and hands-on labs taught by University faculty. Each

summer one SAI session is held in Corvallis, and a second in La Grande. Since its inception in 1989, SAI has enrolled hundreds of Oregon teachers and has been recognized by the Oregon Department of Agriculture with its *Excellence in Education* award.

## ***Healthy planet: RESEARCH*** **Breathing new ideas into global challenges**

### ***Healthy planet: Designing technology for innovative alternative energy sources***

Two researchers in the Department of Biological and Environmental Engineering (BEE) are conducting research which, when implemented, may help address global energy needs and reduce the carbon footprint of developed and developing nations, while maintaining living standards.

**Ganti Murthy** is addressing the development of algae derived ethanol and biodiesel. Other BEE research faculty conducting research in alternative energy solutions include **Hong Liu** (microbial fuel cells) and **Frank Chaplen** (metabolic engineering). In addition to basic research, Murthy is conducting life-cycle analyses and building process models for various alternative energy scenarios. This work is highly collaborative among colleagues at OSU and other institutions.

Algal fuels have a huge potential for energy production, perhaps as much as 20 to 30 times the production of land-based crops like corn. The chief limiter for energy production from algae is technology, whereas with land-based sources, the difficulty lies in the basic science. There is an upper limit to the productivity of corn. Algae have the potential to meet a significant portion of U.S. energy demands. Although open ponds are the least expensive method for algae production, they have inherent limitations. Murthy and his colleagues are attempting to solve these basic problems.

In conjunction with Murthy's work, Oregon State University will host a second national Algae Initiative meeting in summer 2009. Representatives of energy industries, government agencies, and institutions of higher education have contributed to both of these meetings. The goal is to bring interested parties of diverse backgrounds together to discuss technical and policy questions relating to algae-based fuels.

In other bio-based energy work in BEE, **Roger Ely** hopes to harness the power of cyanobacteria to split water using solar energy to release hydrogen. Cyanobacteria are ancient prokaryotes with simple genomes that engage in photosynthesis, and are a natural part of the aqueous environment. Water and heat are the only byproducts of the utilization of hydrogen as an energy source. Ely seeks to harvest energy over a range of light intensities and wavelengths. The storage of hydrogen is another pertinent research question; Ely collaborates with colleagues throughout the world on these questions.

### ***Healthy planet: benefits from collaborations within the Center for Genome Research and Biocomputing (CGRB)***

The **Center for Genome Research and Biocomputing** at OSU is a model for the strength of collaboration of scientists across the University. The College has been a major participant in this Center and 49 of the 90 faculty currently listed have appointments within the College of Agricultural Sciences.

**Todd Mockler, Department of Botany and Plant Pathology**, was hired through the Computational and Genome Biology initiative funded by the provost's office. His laboratory provides international leadership for several important crop models. Among these are transcriptome sequencing and genome annotation efforts for *Brachypodium distachyon*, the premier model for economically important crops including wheat, barley, and grass crops with the potential for bioenergy applications. In collaboration with **Scott Givan** of the CGRB, Mockler hosts and manages the genome database for *Brachypodium*.

Mockler's group also leads the transcriptome sequencing and genome annotation efforts for the diploid strawberry, *Fragaria vesca*, a model for the Rosaceae, which include a number of economically important fruit crops including apple, pear, plum, peach, almond, cherry, and apricot. As in the case of *Brachypodium* this is an international effort. A team of OSU researchers from the Mockler lab and collaborator Scott Givan are making a key contribution to the field of genome assembly and annotation.

### ***Healthy planet: Shifting focus from maximum yield to minimum impact***

Historically, OSU has produced fertilizer guides which offered a prescriptive guide for crop fertilization, assuming the production goal was maximum yield. For more than ten years, **John Hart, Department of Crop and Soil Science**, has led state, regional, and national efforts to approach fertilization from an understanding of crop growth, development, and interactions with pests and the environment. Accessing this greater knowledge base, it is possible to fine tune nutrient applications for crops and to maximize profit while minimizing environmental impact. Cranberries, Christmas trees, and western Oregon wheat have each had research-based nutrient management guides written by Hart and his colleagues across the OSU campus, region, and nation. Hart's professional peers and agricultural producers alike have recognized his work and given him and his publications numerous awards. The wheat guide was released in 2009 in anticipation of the many-fold increase in wheat acreage that has occurred in western Oregon.

### ***Healthy planet: Assessing land and sea with satellite technology***

Building on earlier research into global assessments of ocean productivity, a team led by **Michael Behrenfeld, Department of Botany and Plant Pathology**, reports the first satellite-based evidence linking phytoplankton fluorescence to iron stress in surface waters. Images collected by a sensor aboard NASA's Aqua satellite between 2003 and 2007 led to the discovery that high fluorescence levels were strongly correlated with low iron levels in ocean surface waters. Researchers say the technique could be used to monitor iron stress in phytoplankton and to analyze iron-fertilization experiments. Sufficient iron levels in marine environments are associated with optimal phytoplankton carbon sequestration.

Soils maps, showing soil type and potential land use, are significant tools in effective natural resource planning. Historically, these were developed by physically sampling soils along transects. Vast areas of the western United States have remained unmapped because this technique is impractical there. **Jay Noller, Department of Crop and Soil Science**, has developed remote-sensing and machine-learning techniques to overcome these barriers. Combining knowledge of landscape formation with information obtained from satellite imagery and other map sources has allowed mapping of remote areas. Noller has been awarded large, multiyear grants from the USDA and the Oregon Department of Administrative Services to ground truth his mapping techniques across Oregon. Successes to date raise the probability that remote areas of

the United States and the world will have soil maps to assist in informed land use decision-making.

### ***Healthy planet: Restoring healthy coastal ecosystems***

Collaboration between **Dennis Albert, Department of Horticulture**, and the Hinsdale Wave Research Laboratory (Civil Engineering) has potential consequences for coastal management, as coastal engineers increasingly are exploring alternative approaches to shoreline protection other than shoreline hardening. Albert has identified *Schoenoplectus pungens*, a widely adapted native bulrush, along the Oregon coast, where it had been thought to be uncommon. Instead, he found it thriving in high wave energy estuaries from the Columbia River to Newport.

The plant stabilizes sediments, and will slow or prevent the closure of shipping channels. When incorporated in wetland restoration efforts, it provides habitat for shore birds, fish spawning, immature fish, and other marine life in environments where most wetland plant species cannot survive. Many developed coastal areas such as Newport, Tillamook, and Astoria have hardened shoreline at the sites of docks and coastal industry. It is likely that these areas previously were stabilized by bulrush. As some of these activities are abandoned, it is increasingly common to see sections of shorelines restored to wetland; Albert and his collaborators are attempting to verify the suitability of the bulrush for restoration of shorelines exposed to high energy wave action. There is interest in the Gulf of Mexico in utilizing such plants as a living first defense against storm damage. It was observed after hurricanes Katrina and Rita that areas with intact coastal marsh in front of dikes sustained less damage than those with only hardened shoreline.

Experimentation has demonstrated that the plants can be easily propagated from cuttings in the moist, mild Oregon winter, are more readily established from direct seeding than previously asserted in the literature, are more tolerant of a broad range of soils, and respond to minor increases in soil nutrients. *S. pungens* appears to be a good candidate for development of commercially grown stock for wetland restoration.

### ***Healthy planet: Riveting audiences with cetacean research***

A National Geographic Channel film, *Kingdom of the Blue Whale*, spotlighted research on the largest animal on the planet through the work of **Bruce Mate**, director of the **Marine Mammal Institute** at Hatfield Marine Science Center and colleague John Calambokidis of Cascadia Research Cooperative. Filming took place off the coasts of California and Costa Rica, following 15 tagged blue whales tracked via satellite technology that Mate helped pioneer. Revealed through the video are important new understandings about the blue whale, which had been hunted nearly to the point of extinction by the 1890s. What had once been a splinter group off the coast of North America is now prominent in the gene pool of the blue whale because of sharp reductions in numbers of other groups. This work has increased Mate's understanding of the link between a persistent seasonal upwelling off the coast of Costa Rica and blue whale breeding and feeding. The filming documented the first known calving area for blue whales. According to Mate, "The technology is improving every year and the tags we developed at Oregon State have been crucial to our success in tracking these animals over great distances and long periods of time. They have allowed us to describe the blue whales' seasonal distributions and define their critical habitat." The popular documentary features captivating underwater video of blue whales feeding, diving and interacting, as well as computer-generated graphics that illustrate the whales' biology, communication, and migration.

The 2-hour National Geographic feature earned the **highest ratings ever** for a natural history project on the National Geographic Channel. A companion article published in the March issue of *National Geographic* magazine continues to be the **most popular story of 2009** with *National Geographic* readers.

### ***Healthy planet: Cheating at the microbial level***

In many social systems, there is the opportunity for individuals to cheat, taking advantage of the benefits of the group, but not paying the cost of participation. **Martin Schuster, Department of Microbiology**, has found this also to be true of communicating microorganisms. Bacteria too can be social; they communicate by sensing and responding to self-produced chemical signals, allowing the production of common goods and coordination of group activities. This mechanism, commonly referred to as quorum sensing, is important medically because it allows pathogenic bacteria to produce shared virulence factors that cause disease. The pathogenic bacterium *Pseudomonas aeruginosa* cheats by ceasing to produce such virulence factors. Instead, these cheater variants thrive by taking advantage of production by the group. Cheaters demonstrate the sociality of microbes, and provide a compelling resolution to a long-standing paradox that although quorum sensing is required for infection in animal models, quorum sensing-deficient variants are commonly associated with infections. This work suggests that quorum sensing would be an excellent novel drug target. More generally, the work on the sociality of microbes is seen to have great potential to offer insights into the genetic determinants of behavior in more complex organisms that are significantly more difficult to study.

### ***Healthy planet: Securing an adequate global food supply***

**Chris Mundt, Department of Botany and Plant Pathology**, is studying the potential for diseases of plants and humans that can travel with the wind to spread far more rapidly than previously has been understood. These findings raise concerns for a new fungus that threatens global wheat production. While most pathogens move in a fairly predictable manner and at a constant rate of speed, a significant number can be borne on the wind or by migrating birds. In those cases, although only small amounts of an invading pathogen may show up at any one remote spot, the pathogen has the potential to establish a foothold and spread rapidly at this distant location – giving the invading pathogen the ability to accelerate as the epidemic spreads. These findings suggest that a new fungal pathogen of wheat that emerged a few years ago in Uganda may pose a much more urgent threat to wheat production around the world than is currently understood. That new type of wheat stem rust, Mundt said, has the potential to attack 75 percent of the world's known wheat varieties and, in a bad year, might cause up to 50 percent crop losses in some parts of the world. "This wheat disease problem could be global within a few years," Mundt said. "We would be foolish to ignore it."

### ***Healthy planet: Comparing organic and conventional dairies***

Dairy researchers from Oregon State University, Cornell University, and the University of Wisconsin-Madison have received nearly \$1 million in USDA funds to seek correlations between management practices, incidences of diseases, and the amount of milk produced on conventional and organic dairies. Data from the four-year study will be used to develop recommendations for dairy herd management to promote bovine health and optimize dairy income and milk quality.



OSU is represented by **Mike Gamroth, Department of Animal Sciences**. “There’s a lot of speculation about the difference between organic and conventional dairy farms,” Gamroth said. “It has been a common belief that organic herds don’t produce as much milk as conventional, and that disease is an ongoing problem. I’m not sure that’s true. This grant allows us to put some real numbers on the issue.” Oregon had experienced several years of 5 percent annual increase in production of organic dairy products although current economic conditions appear to have flattened that trend.

In related work, **Troy Downing, OSU Tillamook County Extension**, has revised dietary phosphorus recommendations for the dairy industry to ensure efficient uptake, quality animal performance, and reduced water quality concerns. Downing has also identified improved forage varieties for greater operation efficiency and investigated nitrogen movement from dairy waste, nitrogen uptake by forage crops, and whether higher quality forages fertilized by manure will improve dairy cow performance. These revised recommendations are being adopted by the industry.

### ***Healthy planet: Producing nematode-resistant cereal lines***

Wheat is the most profitable crop in most of the dryland areas known to be infested with the root-lesion nematodes *Pratylenchus neglectus* or *P. thornei* nematodes. Yields of susceptible wheat varieties can be reduced by as much as 60 percent in Oregon. **Richard Smiley, Columbia Basin Agricultural Research Center**, estimates that root-lesion nematodes reduce Pacific Northwest wheat yields by up to 5 percent annually, equaling 361,000 metric tons valued at \$51 million. Smiley and colleagues have investigated differences in field tolerance among wheat and barley varieties. They assayed several thousand lines from crosses with imported wheat lines expressing high levels of resistance, and anticipate the transfer of highly resistant lines within the next year, greatly reducing the time and complexity currently required to identify plants carrying the resistance genes. The group has developed a molecular method to improve accuracy and reduce the cost for identification and enumeration of these nematode species in commercial nematode diagnostic laboratories and, with USDA-ARS scientists, also developed a multiplexing assay to enable each species to be quantified as well as identified from a single DNA extract from soil.

In closely related efforts, Smiley has identified genes that impart resistance in wheat or barley to the cereal cyst nematode *Heterodera avenae*, which occurs in at least seven western states. Exotic wheats or barleys bearing the genes of interest were crossed with Pacific Northwest cereal varieties; selected crosses were found also to carry this resistance and are being re-examined before delivery to wheat breeders as resistant varieties. The work was complicated by the first identification of another closely related cereal cyst *Heterodera filipjevi*, the first report of that species in North America. Although the gene does permit low levels of reproduction of this cyst nematode, the team has developed low-cost assays for dissemination to commercial agricultural laboratories in support of western cereal production.

### ***Healthy planet: Investigating alternatives for agriculture***

In celebrating its 75th anniversary, the **Agricultural Research Foundation** at OSU awarded grants totaling more than \$500,000 to Oregon State University scientists, including these two, each valued at \$100,000:

- **Sujaya Rao, Department of Crop and Soil Science**, heads a pollinator study which seeks to enhance crop production in Oregon by augmenting and managing populations of native bumble bees.
- **Donald Armstrong, Department of Botany and Plant Pathology**, heads a team examining an herbicidal compound produced by soil bacteria that shows promise as a bio-control for grassy weeds.

The grants come at a critical time for agricultural research, as the recession puts a strain on funding. The Agricultural Research Foundation is a private, non-profit corporate affiliate of OSU. Its board comprises representatives of Oregon's major agricultural industries.

**Department of Horticulture's Vaughn Walton and Jeff Olsen, OSU Yamhill County Extension**, have refined integrated pest management strategies for the four principal pests of hazelnuts: the filbertworm, filbert aphid, filbert leafroller, and obliquebanded leafroller. Effective dissemination efforts have promoted grower adoption of these management practices, and reduced pesticide applications to Oregon's hazelnut crop. Pesticide applications against filbert aphid have declined each year since the establishment of the aphid parasitoid *Trioxys pallidus*. Through the adoption of synthetic pyrethroids, growers have reduced pesticide applications for filbert aphids and filbertworms from pounds to ounces of active ingredient per acre.

**Jim Owen and Richard Regan, North Willamette Research and Extension Center (NWREC)**, are validating the use of struvite, an ammonium-magnesium-phosphate mineral byproduct of municipal waste water treatment, in sustainable nursery production. Early data show promise: one shade tree nursery producer was able to reduce nitrogen fertilization by one third, at a savings of tens of thousands of dollars annually, while another reduced water applications by one third. Both results, if generalizable, will have important sustainability implications for the nursery industry.

## ***Healthy people: RESEARCH*** **Safeguarding human health**

### ***Healthy people: Collaborating to define trans-Pacific health threat***

Oregon State University has been chosen as the home of a new **Superfund Basic Research Program**, and will use a \$12.4 million, four-year grant to study the health risks and impacts of polycyclic aromatic hydrocarbons (PAH), an increasing health risk from air pollution coming from Asia.

The grant from the National Institute of Environmental Health Sciences will primarily support a range of new studies by scientists from OSU and the Pacific Northwest National Laboratory, but should ultimately involve the efforts of dozens of researchers across Oregon and Washington.

"To be selected for a program such as this is really a crown jewel for the university," said **Craig Marcus**, professor and head of the **Department of Environmental and Molecular Toxicology**. "The health risks posed by PAHs are a real concern for humans, since they can cause cancer and their emissions are increasing. We're going to do the basic research on those health concerns that will help policy makers better address the risks."

The new grant reflects an international concern about these contaminants, not only from local sources but from air pollution resulting from coal fired energy production in Asia. It is estimated that 25-30 percent of the particulate matter in the Los Angeles Basin originates in Asia. PAH emissions can travel across the Pacific Ocean in less than a week and become even more toxic and carcinogenic through photochemical reactions. The grant highlights ongoing OSU research in the toxicity of PAHs, and will initially support studies on six general topics. Results of these initial studies will assist researchers in gauging PAH effects on human health. The project includes a translational and community outreach component to bring its findings to the attention of other scientists and the general public. (See related work by Staci Simonich, in greater detail below, in “International activities and accomplishments.”)

### ***Healthy people: Mediating nanoparticle toxicity***

The nanotechnology industry is growing rapidly and there are a multitude of applications for engineered nanomaterials. While environmental and human exposure to nanomaterials is expected to increase proportionally, assessment of potential toxicological risks to the environment and human health has not kept up. Using a model yeast system, **Alan Bakalinsky, Department of Food Science and Technology**, explores toxicological reactions at the cellular level from exposure to manufactured nanoparticles, with important parallel implications for human health. The long-term goal of this work is to determine the mechanisms by which manufactured nanomaterials are toxic to cells in realistic environmental exposures, to identify functions mediating toxicity caused by nanoparticles, and to discover how the physical-chemical properties of these engineered nanomaterials correlate with toxicity. **Robert Tanguay, and Stacy Harper, Department of Environmental and Molecular Toxicology**, collaborate with Bakalinsky in studying the human health impacts of nanomaterials. Their studies employ zebrafish embryos to screen large numbers of nanomaterials to identify their relative safety in the environment.

### ***Healthy people: Ensuring the safety of specialty foods***

**Yanyun Zhao and Mark Daeschel, Department of Food Science and Technology**, along with co-investigator Richard Dougherty, Washington State University, received more than \$400,000 in USDA Integrated Food Safety funds to address the safety of specialty foods. These are high-value foods made in small quantities from high-quality ingredients, and that command premium prices. The project will assess current practices, determine knowledge gaps, and will develop and deliver training programs for food inspectors, processors, and others involved in the production of specialty foods. This project will enhance current understanding of potential food safety hazards associated with specialty food production and identify appropriate training to ensure the best production practices. By participating in training, food inspectors will be able to provide more practical and effective inspections and associated recommendations for specialty food processors. Processors themselves will become cognizant of specific practices that eliminate or minimize hazards, thus providing safer food products.

### ***Healthy people: Easing vitamin deficiencies through potato improvement***

A high-vitamin potato will help decrease the incidence of vitamin deficiencies that are still common worldwide. The research group led by **Aymeric Goyer** at the **Hermiston Agricultural Research and Extension Center** was funded by the Agricultural Research Foundation and the Oregon, Washington, and Idaho potato commissions to conduct research on thiamine and folate

in potatoes. The objective of this research is to develop a high-vitamin potato capable of alleviating deficiencies of these essential nutrients. Researchers will identify naturally vitamin-rich genotypes and will use other biotechnological approaches to improve vitamin content of potatoes. This research will promote the nutritional value of potatoes, and strengthen market opportunities for specialty potatoes. Goyer leads a multi-state effort of 16 co-investigators from seven states who have submitted a multi-million dollar grant proposal to the USDA Specialty Crop Research Initiative.

## ***Healthy economy: RESEARCH*** **Sustaining agriculture, livelihoods**

### ***Healthy economy: Valuing irrigation in the Upper Klamath Basin***

Following a large multidisciplinary study—the Klamath Assessment Project—many unresolved issues and important questions remained. In particular, there were questions about how to avoid costly future water crises, as opposed to simply evaluating the impact of a major 2001 water-shortage event. **Bill Jaeger, Department of Agricultural and Resource Economics**, compiled information and conducted applied research on three of these important matters and then disseminated information in a succinct form to promote an understanding of the constraints and possible opportunities that exist for resolving future water-related conflicts. The three analyses are based on work with Klamath farmers, federal and state agencies, and local experts.

- The first issue concerned the economic value of irrigation water across the Upper Klamath Basin. The value for a typical crop rotation on a specific soil type was found to vary by a factor of 20 across differing soil types; it follows that the economic cost of a water shortage will depend on the particular area of the basin affected.
- The second issue explored how water transfers, such as water markets or water banks, could open options to farmers facing a water shortage. The cost of future water shortages could be much lower if it were possible to reallocate water by way of voluntary trades, say, from farmers with low-productivity land to those with relatively high-productivity land. Based on an economic model of the Upper Klamath Basin, the analysis demonstrates that the cost of the 2001 water shutoff could have been reduced by 75 percent had a water transfer mechanism been available. These results were later reinforced with a more detailed analysis conducted by a masters degree student and published as a thesis.
- The third issue examined the effect of energy prices on irrigated agriculture. In exchange for rights to develop hydropower on the Klamath, an energy company committed to artificially low energy prices for irrigators in a 50-year contract with the Bureau of Reclamation. These contract prices varied from one-fifth to one-tenth what other Oregon irrigators have paid. The economic evaluation sought to answer the question, *What would happen if farmers in the area lost these preferential energy prices?* The analysis found that highly productive irrigated lands would continue to be profitable even with higher energy prices, although energy-intensive sprinklers could render some lands unprofitable. If some portion of this irrigation water became available for other uses—for example through voluntary exchanges that would result in increased in-stream flows—some progress toward alleviating the region’s water conflicts could be made without significant harm to the region’s overall agricultural economy.

Currently there are on-going negotiations toward a “comprehensive settlement” of Klamath River water issues that involve the states of Oregon and California, the Bureau of Reclamation, the Klamath tribes, Pacific Power, commercial salmon fishers groups, and the Klamath area irrigators. According to some parties involved, the analyses by Jaeger have been utilized and referred to frequently as part of these negotiations.

### ***Healthy economy: Improving crops, promoting grower profits***

Over the years, the College’s statewide Potato Breeding Program has released many traditional processing and fresh market russet potatoes, but in recent years interest has grown in specialty potatoes, which have colored skin or flesh. Such potatoes have potential health benefits from their high antioxidant levels and offer opportunities for unique product development such as colored potato chips or salads. A new release, Purple Pelisse, is a purple skinned, purple fleshed potato offered under exclusive or semi-exclusive licensing to afford the license holder(s) the opportunity to better recoup the investment needed to make sales of this variety successful. This licensing arrangement is a first for Oregon and is being done in cooperation with the Potato Variety Management Institute (PVMI), a PNW grower cooperative which is unique in the nation. **Isabel Vales, Department of Crop and Soil Science**, leads the Potato Breeding Program, carried out on campus and at four branch experiment stations.

### ***Healthy economy: Investing to ensure sufficient pollinators***

With the support of the State of Oregon Legislative Emergency Board, Oregon State University has hired a honeybee researcher as part of an initiative to ensure sufficient healthy honeybee pollinators for Oregon’s high value crops. The position was created in response to industry concerns about the supply and health of honeybees, which pollinate berries, tree fruits, squashes and vegetable seeds, among others. Current production systems depend heavily on the honeybee for necessary pollination services.

**Ramesh Sagili, Department of Horticulture**, is the first honeybee expert on OSU’s faculty since Michael Burgett retired in 2002. Sagili, who earned a doctorate in entomology from Texas A&M University, will focus on research into honeybee health, and will conduct outreach to the honeybee industry. Sagili observed that *Varroa* mites, nutritional deficiencies, or other factors may be the cause of colony collapse disorder, a phenomenon that came to light in 2006. With entomologist **James Young, Department of Botany and Plant Pathology**, Sagili will collaborate on a comprehensive examination of the health of Oregon’s honeybees.

### ***Healthy economy: Oregon Wine Research Institute moves ahead***

Leaders in the Oregon wine industry continue to work with the College of Agricultural Sciences in establishing and staffing the **Oregon Wine Research Institute**, envisioned as an industry-University partnership to advance and extend knowledge about viticulture, enology, and business. Grape growers, vintners, and others involved in wine production and marketing pledged in 2007 and 2008 to contribute \$2 million to fund a director’s position for five years along with support staff and program. The 2007 Oregon Legislative Assembly provided \$500,000 per year in the 2007-2009 budget of the Oregon Agricultural Experiment Station toward Institute-related staffing and programs. These resources, along with targeted funding from the Oregon Wine Board and already existing wine-related faculty strengths in horticulture, food science, and business, promised greater responsiveness to industry, expanded research, and systematic outreach.

Strategic direction would be shaped by counsel provided through the Institute's Policy Board, an advisory body to the dean of the College of Agricultural Sciences comprising both industry and University members.

A search that began in 2008 for a director of the Oregon Wine Research Institute spanned the globe. Members of a search and screening committee were drawn equally from industry and OSU. Three candidates with strong backgrounds were interviewed on campus and around the state. Unfortunately, none of the candidates was seen to fully meet the high expectations of the position and the search was declared failed. A new search is expected to get underway soon after the College's new dean, Sonny Ramaswamy, arrives and the OWRI Policy Board meets in August 2009 to review a revised position announcement. Among expected changes will be a provision for the director's position to be tenure-track.

A post-doctoral research scientist formerly with the University of Nevada-Reno was appointed this year as a research viticulturist. **Laurent Deluc, Department of Horticulture**, has responsibility for developing a recognized research program that will improve the quality and performance of grape vines, and enhance grape and wine quality. His position is within the Oregon Wine Research Institute. In his role, Deluc brings expertise in two areas important to Oregon wine growers: the expression of genetics as quality wine grapes and the response and management of grape vines to environmental stresses such as drought and cold.

Deluc will work closely with the Oregon wine industry, with other scientists in the Oregon Wine Research Institute, and in related fields at OSU, as well as with colleagues at Washington State University and the U.S. Department of Agriculture. A search committee of Oregon wine industry representatives, OSU faculty, and others guided recruitment and screening that led to Deluc's appointment.

Budget reductions imposed on the Oregon Agricultural Experiment Station and the OSU Extension Service during the 2007-2009 biennium, as well as additional reductions necessary in the 2009-2011 biennium, are likely to reduce state appropriations available to the Oregon Wine Research Institute. In the meantime, however, research and outreach programming for the still-growing Oregon wine industry—through the College of Agricultural Sciences and the College of Business—continues to move forward.

### ***Healthy economy: Advancing hazelnut production and research***

OSU hazelnut breeding program has released two new varieties, 'Yamhill' and 'Jefferson,' according to **Shawn Mehlenbacher, Department of Horticulture**, who leads the Hazelnut Breeding Program. Both varieties are eastern filbert blight (EFB) resistant. Oregon's hazelnut industry was severely threatened by the introduction of EFB in the mid-1980s. 'Yamhill' has been developed for the kernel market and 'Jefferson' for the in-shell. In-shell hazelnut sales, the traditional Oregon niche market, are about 7 percent of the world market. Growers have responded to the release of 'Jefferson' with enthusiasm; gross hazelnut acreage is increasing with the advent of these resistant varieties. 'Jefferson' is similar in appearance to the familiar 'Barcelona,' and should attract higher returns in the world market. 'Yamhill' produces small nuts with few defects. It is suitable for the kernel market, and has the potential to produce about twice the tonnage per acre as Barcelona. Two new pollinizers for the late-blooming 'Jefferson' were released this year as well. Economic activity related to micro-propagation of these new varieties

is a result of this research; commercial micropropagators have sped up production in response to grower demand for plant materials.

Also furthering important research into hazelnuts is **Todd Mockler, Department of Botany and Plant Pathology**, who leads the hazelnut genome project. In collaboration with Illumina, Inc, of San Diego, Mockler is sequencing, assembling, and annotating the hazelnut genome. This effort fills in a major gap in the genome sequences available for crop plants and trees. Hazelnut has numerous advantageous physical, genetic, and genomic attributes as a model species for the *Betulaceae* family. *Betulaceae* includes deciduous nut-bearing trees and shrubs totaling 130 species, including birch, alder, hazel, hornbeam, and hop-hornbeam. This group includes a number of valuable and popular ornamental trees. Hazelnut kernels are high in oil content (60-68 percent) and thus have potential relevance to research on biofuels and lipid metabolism in oil crops.

### ***Healthy economy: Breeding resistance into wheat varieties***

The OSU Wheat Breeding program led by **Jim Peterson, Department of Crop and Soil Science**, has had a great success in the Clearfield wheat varieties. Clearfield wheats contain a gene imparting resistance to a common herbicide of problem weeds such is downy brome and jointed goat grass. Grassy weeds are extremely difficult to control effectively and reliably, especially in eastern Oregon and Washington dryland cropping systems. Clearfield wheats are bred using traditional methods, and have above average agronomic performance and quality. Conservative estimates place acreage of these improved varieties in 2008 at more than 325,000 acres in Oregon and Washington. Conservative estimates suggest that a minimum of \$1.625 million was added to the Pacific Northwest economy in a single year from these two OSU wheat varieties alone. These varieties are managed under an OSU-developed licensing program that is shared with University of Idaho and Washington State University. The resulting unified regional licensing system provides ease of access to new genetic materials and provides income to re-invest in the research program.

### ***Healthy economy: Defining organic production methods in blueberries***

Oregon has a diverse, economically important berry crop industry; commercial berry production takes place on more than 1,000 Oregon family farms. Berry acreage has increased almost four-fold in the past decade. The 2008 harvest of 20,000 acres had a farm gate value of more than \$140 million. As blueberry acreage grows, new growers require basic information on all aspects of production, and experienced growers struggle to remain economically viable in a competitive global market. The research and Extension efforts of the OSU Berry Research Program, led by **Bernadine Strik, Department of Horticulture** and the **North Willamette Research and Extension Center**, seek to inform growers' decision-making and improve their economic viability and sustainability.

Demand for organic blueberries exceeds supply, yet little published information on the best organic blueberry production systems has been available to growers. The Berry Research Program established a multi-disciplinary advisory committee including researchers and industry leaders in Oregon and Washington. They designed research around results of a needs assessment and developed a plan to establish a research trial and associated Extension programming. They successfully solicited funding from multiple sources, and established a one-acre organic production research trial at the North Willamette Research and Extension Center, where the

impacts of fertility, planting system, cultivar, and weed management practices on establishment, production, and economic returns are studied. Research findings will be of benefit to both organic and conventional growers.

This experiment is the *largest certified organic blueberry trial at a research facility in the world*. Outcomes to date include active student learning and economic publications. Information from this research trial will advance scientific knowledge of organic production systems and blueberry physiology worldwide and will help support the health and viability of family farms.

### ***Healthy economy: Re-establishing oyster species***

Kumamoto oysters, known for their smooth texture and refreshing flavor, are prized by connoisseurs, and relished by beginners. According to **Chris Langdon, Central Oregon Marine Experiment Station, Newport**, West Coast production began to decline from inbreeding depression, necessitating the collection of new broodstock from the northern Ariake Sea, Kumamoto Prefecture, Japan. This broodstock was put into the Agricultural Experiment Station's Molluscan Broodstock Program's quarantine culture system, where the entire first generation and early life stages of the second generation were maintained under quarantine and subjected to extensive disease exams. About 50 of the second generation families produced in 2009 will be planted in Yaquina Bay for the establishment of new Kumamoto broodstock for commercial hatcheries. The annual market value of Kumamoto oysters is estimated at \$8.3 million.

In further work, a pilot project to evaluate the feasibility of re-establishing native Olympia oysters in Oregon—without damaging native eel grass, a protected plant species—has completed its third year and researchers say tests conducted in Netarts Bay near Tillamook show promising results. Oyster seed planted in test plots in 2005-2006 survived three full years and established larvae on shells placed in the bay. Assessments indicate colonization may have begun, and larvae were found on nearby structural material. During the height of the Olympia oyster harvests in the 1890s, some 130,000 bushels of oysters were shipped annually from the Pacific Northwest to California. Within 20 years, 90 percent of these native oysters had disappeared. Prized for its distinctive flavor, the Olympia oyster was found in many Oregon and Washington estuaries until over-harvesting and habitat loss through development all but eliminated the species.

### ***Healthy economy: Tracking albacore in the Pacific Northwest***

A bar-coding system now traces the history of ocean fish from ocean to market. Pacific Fishtrax, a joint venture among the Coastal Oregon Marine Experiment Station, the Community Seafood Initiative, and Oregon commercial fishermen, is a scientific venture and public outreach effort designed to highlight the state's commercial fishing industry and strengthen wild fish runs. Fishtrax's pilot project, Collaborative Research on Oregon's Ocean Salmon (CROOS), was to have focused on Oregon's ocean salmon, but widespread closure in 2008 of the Pacific Ocean to salmon fishing to protect weakened runs prompted the project to move to albacore. One hundred commercial fishermen participated with Project CROOS. They logged catch locations and ocean conditions for the fish they had caught and sent fin and tissue samples to a laboratory that profiles DNA.



### ***Healthy economy: Informing economic policy and decision making***

**Extension and Experiment Station Communications** communicators produced more than 200 reports, news, and feature stories that explain the impact of OSU research to voters, legislators, industries, families, and communities. These stories were used by hundreds of news, industry, and educational media as well as by OSU administrators.

For example, in partnership with the College's agricultural economists, communicators prepared materials that explained the complex economics of ethanol production in Oregon and the future of biofuels and bio-based products to replace petroleum products. In partnership with Extension's Agricultural Sciences and Natural Resources Program, the communicators explained how OSU has helped grass-seed growers change the course of their industry; a story used in the annual report of OSU's president to the University's stakeholders.

## ***Healthy planet: OUTREACH AND ENGAGEMENT*** **Delivering sustainable production, lifestyles**

### ***Healthy planet: Defining what we do***

A traditional strength of Extension is the authority to introduce research-based fact into an emotionally-charged decision making processes. This role is perhaps even more important than it has been in the past, due to the nature of the issues and the web democratization of journalism. During 2009, Extension faculty contributed a steadying hand to the discussion or management of such topics as the proposal to undo an existing agricultural isolation district, the re-introduction of the gray wolf into cattle country, and the deepest economic recession in 80 years. To better reflect the scope of its outreach and education missions, and the diversity of audiences served, the name of the Extension Agriculture Program has been changed to Extension Agricultural Sciences and Natural Resources Program. Injecting data into the decision-making process is a recurring theme in this sampling of outreach and engagement activities.

### ***Healthy planet: Protecting an agronomic treasure***

Canola holds promise as a biofuel crop for Oregon, but is highly prone to escape from cultivation. It readily cross-pollinates with important vegetable seed crops, and promotes disease and insect pests that have economic impacts on Oregon's vegetable and vegetable seed production.

The Oregon Department of Agriculture's director Katy Coba ultimately ruled in favor of continued protection for the state's historic seed production district when grass seed and grain producers sought to undo these traditional prohibitions so that they might add canola to their rotations.

**Russ Karow**, head of the **Department of Crop and Soil Science** and **Mark Mellbye**, **OSU Linn County Extension**, listened to months of testimony and presentations from both sides of the issue. Interim dean Bill Boggess praised Karow's leadership abilities in the face of a controversial and difficult process. Koba acknowledged the efforts of **Tom Chastain**, **Daryl Ehrinsing**, **Mike Halbleib**, **Amy Dreves**, and **Carol Mallory-Smith**, all of the **Department of Crop and Soil Science**; **Cindy Ocamb**, of the **Department of Botany and Plant Pathology**; **Jim Myers**, **Department of Horticulture**; and **Bill Jaeger**, **Department of Agricultural and Resource**

**Economics**, all of whom provided the committee with underlying research, and permitted a decision to be made on the basis of the science.

According to Craig Armbrust, Willamette Valley Specialty Seed Crops Association, the ruling opens a special opportunity for the Pacific Northwest to become “the vegetable seed production capital of the world.” Traditional European seed producing regions have transitioned to lower-value forage seed production after the widespread introduction of crop species incompatible with vegetable seed production. He notes that specialty seed production has increased 8 to 10 percent in the past decade. As part of the ruling, the specialty seed industry will contribute to the development of a web-based mapping system to provide real time information on the location of specialty seed crops, and ensure sufficient separation from incompatible species. The industry will further work with producers of lower-value seed to identify specialty seed compatible rotation crops. Armbrust called for further research into these consistent concerns of specialty seed growers: pollen transfer and disease and insect pests.

### ***Healthy planet: Promoting sustainable gardens, local food production***

When the Master Gardener program began in the mid-1970s, its primary focus was diagnosing plant problems and offering solutions. While still a major focus, Extension faculty and volunteers working in the Master Gardener program now also develop and deliver a variety of educational programs; the flagship programs for 2008 were *Sustainable Gardening* and *Local and Backyard Food Production*. These programs will guide communications about the program, basic and advanced training opportunities, and planned Extension publications. The Master Gardener program is offered in 28 of Oregon’s 36 counties; volunteers are more aware of Oregon State University, OSU Extension Service, the College of Agricultural Sciences, and how these entities provide extended education to Oregonians. In 2008 3,504 active Master Gardeners made 162,370 public contacts and donated 173,270 hours to the program. Volunteer hours equaled approximately 85 FTEs for Extension, at a dollar value of approximately \$3,380,500.

The following are brief descriptions of these flagship programs, and a few examples of actual services the Master Gardener program is providing to the public within each program.

***Sustainable gardening.*** Lectures, workshops, seminars and Extension publications teach Master Gardeners and others how to adopt and maintain more sustainable gardening practices.

***Local and backyard food production.*** Local and backyard food production contributes to a sustainable food system, greater food security and a nutrient rich diet.

In closely related efforts, **Neil Bell, OSU Marion County Extension**, has sought to identify genuinely drought-tolerant, evergreen groundcovers for sustainable landscapes. Instead, better known but poorly adapted species which tend not to thrive without significant inputs of water, fertilizer, pesticides and labor are chosen. Bell evaluated drought-tolerant, evergreen groundcovers to determine suitability for western Oregon landscapes. Nine retail and 10 wholesale nurseries in Oregon, Washington, and California have taken cuttings from these evaluations and are growing and marketing them. The availability of truly drought tolerant plant selections is a key component in promoting the general adoption of sustainable landscapes for the Pacific Northwest.

***Healthy planet: Integrating pest management for efficiency,  
sustainable production***

**Robin Rosetta**, nursery integrated pest management specialist at **North Willamette Research and Extension Center (NWREC)**, is using Twitter, the social networking tool, to update Nursery IPM Alerts for growers and fellow researchers in the Pacific Northwest. The “tweets” can be received immediately as text on cell phones or via email. The alerts are pithy as the format restricts broadcasts to 140 characters. Rosetta reports that Twitter enhances communication on pest activity; early awareness permits more options for control while reducing the potential for crop damage. By the end of July 2009, the nursery IPM alert had 53 followers, and had issued 94 updates. Rosetta’s new Twitter website may be found at <https://twitter.com/PNWNurseryIPM>.

**Steve Castagnoli, OSU Hood River County Extension, Helmut Reidl, Mid-Columbia Agricultural Research and Extension Station (MCAREC), and Allison Walston, MCAREC**, designed and promoted an intensive monitoring program for the codling moth that has resulted in wide adoption of more strategic control protocols. In 2008, only one grower sprayed before indicator traps showed a need. All other growers made decisions to treat or not treat based on trap catches and thresholds. Sixty percent of the growers also used monitoring information on beneficial arthropods in their pest management decisions, and all chose specific pesticide products with the intention of conserving beneficial insects. Fruit damage from codling moth was reduced by 92 percent from 2007 to 2008. It is anticipated that these trends will continue in 2009 provided growers continue the coordinated efforts to control the codling moth. This project has improved codling moth control, reduced codling moth damage, and eliminated the majority of the uses of organophosphate insecticides for codling moth management.

**Bob Spotts, MCAREC**, has promoted a similar approach to pear scab management that has been widely adopted in the Hood River and Medford districts and has national and international applications. It is estimated that this management model saves Hood River pear growers about \$500,000 per year. The model is available on the IFPnet and Integrated Plant Protection Center websites and in the online PNW Disease Management Guide. In other work, Spotts identified a yeast that can be used to combat decay fungi in stored fruit. When applied to fruit in the packing house, the yeast grows in small wounds in fruit and outcompetes the decay microorganisms for vital nutrients. The product reduces decay of fruit by more than 90 percent. Thus far it has controlled nine diseases on seven crops, including apple, pear, sweet cherry, grape, papaya, star fruit, and geranium. The yeast has a U.S. patent and is under commercial development, with EPA registration and worldwide marketing as goals. Potential sales could exceed several million dollars per year. This biological control will be a welcome addition to existing integrated decay management programs.

***Healthy planet: Restoring trophic structure to rangeland ecosystems***

Although the return of large predators, such as the gray wolf, suggest healthier ecosystems to some, many livestock producers in the Pacific Northwest have grave concerns regarding the influence of such predators on the behavior of their cattle. Beef producers specifically fear higher death loss, reduced use of the available landscape, and lower productivity, including lower reproductive rates due to stress. With support from the Oregon Beef Council, **Doug Johnson, Department of Rangeland Ecology and Management, Larry Larson, Eastern Oregon University, and John Williams, OSU Wallowa County Extension**, began collecting baseline

data in 2006, before the wolves arrived in Oregon. This work will produce a data set to enable fact-based conversation about a controversial and emotionally charged issue.

The study tracks the movements of GPS-collared cows and wolves in paired watersheds. While statistically significant statements cannot be made without more data collection, Williams has been working to support beef producers with guidelines on how to report wolf sightings or loss of cattle to wolves; he has published a “refrigerator door” fact sheet for regional stakeholders interpreting this complex mix of laws, rules, and regulations. Williams has organized an advisory committee on adaptive management, acts as liaison between campus researchers and the beef industry, and has assumed the role of advisor from the University to an Oregon Cattlemen’s Association wolf task force. The team collaborates with Oregon Department of Fish and Wildlife and the Idaho Department of Fish and Wildlife, sharing information. The research and collaborations already are producing valuable factual information, for example about bovine behavior relative to creeks, which had not been available before. Williams is committed to communicating with beef producers, and keeping the ranching community engaged in the research so that local knowledge will continue to inform it.

### ***Healthy planet: Composting for a healthy planet, healthy plants***

With funding from the Agricultural Research Foundation, **Nick Andrews, NWREC**, and **Dan Sullivan, Department of Crop and Soil Science**, have developed a compost facility at the North Willamette Research and Extension Center. The facility will enable research into the production of high quality, crop-specific composts. Collaboration with **Jim Owen**, also of **NWREC**, seeks to tailor a compost mix to the needs of nursery producers. In collaboration with Oregon Department of Environmental Quality, Oregon Department of Agriculture, and Soil and Water Conservation districts, these faculty are developing plans for a new agricultural composting workshop shortcourse. These workshops are expected to increase recycling of agricultural and other organic wastes resulting in improved water quality, and increase farmer access to high-quality affordable compost for improvement of soil quality. Since 2004, Andrews has served on the ODEQ Compost Facility Rule Making Work Group, where he represents the concerns of small and mid-sized agricultural composters. This work has helped to ensure that new rules will protect human health and the environment while promoting on-farm composting in Oregon.

## ***Healthy people: OUTREACH AND ENGAGEMENT*** **Embracing communities**

### ***Healthy people: Celebrating branch station history, neighbors, and communities***

**Hermiston Agricultural Research and Extension Center (HAREC)** celebrated its centennial in June 2009, with an open house attended by more than 500 people. Federal, state, county, and local officials attended, as did the provost and members of the College’s administration. All major area farms were represented as well.

The Center’s research laboratories were open for public tours, and research faculty were on hand to explain their work. The entertainment value of field trial tours was enhanced by hay ride transportation between the trials. In preparation for the June 30 event, **Matt Kolding, emeritus cereal breeder, HAREC**, and **Sandy DeBano, riparian entomologist, HAREC**, wrote a series of articles documenting the Center’s history and development; these were released on the

Center's website over several months preceding the centennial celebration. During the festivities, Kolding narrated a pictorial history of the station from 1909 to the present. The community provided \$12,000 in cash or in-kind sponsorship to support the celebration.

In the Willamette Valley, the **North Willamette Research and Extension Center** (NWREC) reached over the fence to its Aurora neighbors with a Center tour in June 2009 that is becoming an annual event. Sixty-five neighbors shared strawberry shortcake, learned about the University, the College of Agricultural Sciences, and the research efforts of NWREC faculty. A highlight of the evening was produce donated by local vegetable growers which participants were invited to take home. Center **superintendent Clark Seavert** initiated the annual event in 2008 to enhance community awareness of the Center's mission and activities.

AugustFest 2008 was conducted as an open house educational event for the **Klamath Basin Research and Extension Center**. All programs within the Center were promoted in a fair-like venue for outreach to the community. The event drew at least 720 participants, and has proven positive for marketing the Center's programs to non-traditional users. In other on-site activities, multiple producer meetings and tours were conducted during the growing and harvest seasons, enabling researchers, educators, and stakeholders to exchange knowledge.

***Healthy people: Providing 14 years of pesticide safety from the campus of OSU***

**David Stone, Department of Environmental and Molecular Toxicology**, and director of the **National Pesticide Information Center** (NPIC), a cooperative effort between OSU and the USEPA, completed its fourteenth operational year at Oregon State University on March 31, 2009. During this reporting year, NPIC received 26,440 inquiries, approximately 93 percent of which were addressed over the telephone. The NPIC website continues to be an important source of objective information on pesticides, and received 2,465,802 hits, an increase of about one million hits compared to the previous year. Other NPIC accomplishments for the past year:

- Developed and implemented a severity index for rating human incidents.
- Developed and launched a Veterinary Incident Reporting portal.
- Launched a Spanish-language version of its website.
- Published 12 new pesticide fact sheets.
- Launched a collection of PestiByte PODcasts this year in collaboration with the Environmental Health Sciences Center at Oregon State University.
- Increased capacity to provide information about integrated pest management via new web content and through participation in an International IPM Symposium and a National IPM in Schools workgroup.

***Healthy people: Enriching lives, improving safety, integrating support for the underserved***

Many Hispanic workers employed year round in mid-Columbia orchards have only a primary school education and no formal training in horticulture or math; however, many are key individuals in orchard operations. In collaboration with Columbia Gorge Community College, and based on needs assessments and grower surveys, **OSU Extension Wasco County staff chair Lynn Long** developed and implemented an Hispanic Orchard Employee Education Program.

A twelve-hour Spanish language *Basic Math for Pesticide Applicators* class was developed and taught. Although the classes were scheduled to meet for two hours at a time, enthusiastic students

stayed for more than three hours during each Friday afternoon and Saturday morning meeting time. A *Basic Principles of Cherry Horticulture* class met twice a week for four weeks. This hands-on, interactive series covered the basics of soils, tree growth development, pollination, rootstocks, and varieties. Participants were coached to apply basic math skills in the calibration of sprayers, and to apply pesticides correctly and accurately. Although the training was conducted in October and November, 2007, its impacts are just becoming visible.

Hispanic pesticide applicators have been identified as the population most at risk for pesticide exposure in the Pacific Northwest. Language barriers, low education levels, inability to read product labels in English or in Spanish, and widespread social inequalities contribute to this problem. California and Washington State developed highly effective “Hands-on Handler Training” models in Spanish for these at-risk workers. **Tim Stock, OSU pesticide safety education (PSEP) coordinator**, met with grower associations in the mid-Columbia and Medford regions to explain the need and presented a training model. A “train-the-trainer” event was conducted with the assistance of Washington State Department of Agriculture (WSDA) bilingual trainers. Six bilingual volunteers from industry received “train-the-trainer” preparation and then co-trained with the WSDA trainers and Stock, who is Spanish-English bilingual. Evaluations showed an increase in knowledge and skills among the majority of those trained. Oregon now has the beginning of a network of trainers that can deliver highly effective training to Hispanic pesticide handlers. To date, funding efforts have not succeeded and the program is suspended until appropriate resources are identified.

Nearly 80 representatives of non-governmental organizations, universities, and state and federal agencies gathered in Hood River, Oregon, during September 2008 to take the first step toward creating a more integrated support system for socially disadvantaged, minority, immigrant, and refugee farmers. The organizations represented education, advocacy, technical assistance, and loan programs. The *Multicultural Farming Roundtable* was organized by **Garry Stephenson, Department of Crop and Soil Science** and **Linda Brewer, Department of Horticulture**, collaborating with colleagues from Heifer International, Washington State University, and the USDA Risk Management Agency.

### ***Healthy people: Building confidence and identity for women farmers***

The number of women principal operators in Oregon is on the rise, suggesting a need to tailor programming to these small-scale, diverse producers. The League of Women Farmers is an established agricultural network in southwestern Oregon facilitated by **Melissa Matthewson**, and **Maud Powell, OSU Jackson County Extension** and the **Extension Small Farms Program**. To date, 75 women operators have joined the group. Its objectives are to provide networking and educational opportunities to this growing audience, principally through workshops, farm tours, discussions, and social networking. Participants of the open group set the agenda for their educational activities, which have included tractor training and carpentry. The Small Farms Program has been funded by the Organic Farming Research Foundation to hold field days on organic farming topics specifically for the League. The group is collaborating with a graduate student in the OSU Department of Anthropology, **Jennifer Almquist**, who has interviewed many of the women to assess the impacts of group participation.

Mentoring relationships between beginning and more experienced farmers are one important outcome of participation. The group operates in an atmosphere of support and solidarity; the farming endeavor leaves many women isolated from their peers. Participants experience a solid

camaraderie that validates their contribution to farm productivity. Almquist's data indicates that League membership has increased confidence and a sense of identity in the women, empowering them to claim their place in the small farm movement as innovative producers, rather than the traditional "farmer's wife" identity, and that the women experience an enhanced sense of pride in their accomplishments as a result of League membership. Unique to the Northwest, this group has helped women find a balance between family and farming life. Many have gone on to establish cooperative relationships and have found the skills to build their business through new direct marketing opportunities.

### ***Healthy people: Responding to cultural shift, economic recession***

**Extension and Experiment Station Communications** (EESC) communicators continue to test new ways to deliver Extension information and engage communities in lifelong learning. New web-based learning technologies replace older static print publications as EESC communicators partner with faculty to develop interactive, engaging educational materials. Examples of recent innovations include:

- Designed learning materials for OSU's first non-credit online course, the Master Gardener Training, developed in partnership with Extended Campus. The success of that program has led to the design of more online lifelong learning materials and courses, including Healthy Aging.
- Designed, developed, and implemented a web content management system for use by all Extension programs, county offices, and branch experiment stations. In addition, developed templates for counties and branch experiment stations to use to effectively engage with industry and communities;
- Trained 50 OSU faculty to use a new interactive web technology called Pachyderm to create non-formal, nonlinear learning modules.

EESC led OSU's response to the 2009 recession with a series of information-rich websites. These *Tough Times* websites address the needs of several populations hurt by the current recession. Assistance includes:

- A switchboard to access local services for newly laid-off workers and professionals who never thought they would need to seek help from social service agencies;
- Help for forest sector workers to access stimulus funds and other work opportunities;
- illustrated tips on managing family resources for low-literacy and Spanish-speaking audiences;
- Step-by-step information for first-time gardeners interested in growing their own food.

These sites help county-based faculty reach communities in need with information they can use immediately. Many of the OSU *Tough Times* websites have been posted on legislators' and agency sites.

### ***Healthy people: Re-opening campus dairy plant to new audiences***

Thirty-five years after the OSU dairy plant closed, it has reopened as an artisan cheese pilot plant; its key function is to train OSU students and current or prospective cheese makers in the science and technology of artisan cheese making. The plant further is used to research solutions to problems facing this growing industry, and for product development to expand current artisan cheese selections. A near-term goal is to license the facility, which will allow its use as an

incubator plant for prospective processors. To help future cheese makers navigate through the web of local, state, and federal regulations, an online guide now summarizes required permits and licenses. The number of artisan cheese makers in Oregon is rapidly increasing, and this industry is expected to follow in the tracks of the wine industry.

In collaboration with the Food Innovation Center and Oregon Department of Agriculture, **Lisbeth Goddik, Department of Food Science and Technology**, organized the first annual Oregon Cheese Stories event June 2009. Eighty-one percent of attending cheese makers reported increased sales after the event. In recognition of Goddik's contribution to the artisan cheese movement, she received the 2008 Vice Provost Award for Outstanding Achievement in Strategic Impact and the 2009 award for Outstanding Teaching of Dairy Manufacturing from the American Dairy Science Association at their international meeting in Montreal.

## ***Healthy economy: OUTREACH AND ENGAGEMENT*** **Offering new opportunities**

### ***Healthy economy: Demonstrating local support for Extension***

Within the past four years, Linn, Clackamas, Douglas, and Wasco counties—a broad representation of the state geographically—have successfully passed local service districts in support of Extension, raising the total number of counties with Extension service districts to 19. Within these 19 counties, Extension has a more secure level of support than it would enjoy if funded through counties' general funds.

Choosing to pursue a local service district is a major decision for local Extension staff and their advisory committee members, in no small part because doing so asks the county's voters to tax themselves so that Extension Service programs may be offered there. Extension staff who have led such efforts attest to the challenge, but celebrate when voters give a thumbs-up. Extension staff chairs providing leadership for establishment of service districts in four counties are **Mike Bondi, Clackamas County; Dan McGrath, Linn County; John Panches, Douglas County; and Brian Tuck, Wasco County**. Panches observed that long-term relationships among Extension, its volunteer organizations, and the community are critical if people are to recognize the value that Extension programs provide. "Passage of a service district is a tremendous show of support by the community and a statement confirming the value voters find in Extension," he said.

### ***Healthy economy: Increasing branch experiment station efficiencies, creating local jobs***

Economic stimulus funds and other funds provided much-needed repairs and renovations to the physical plants at **Klamath Basin Research and Extension Center (KBREC)**, **Mid-Columbia Agricultural Research and Extension Center (MCAREC)**, and **Eastern Oregon Agricultural Research Center (EOARC)** at Burns. Deferred maintenance had accumulated at all three locations. The improvements permit greater efficiency in execution of station missions, increased service to Oregon's growers, and created local jobs.

KBREC benefited from U.S. Bureau of Reclamation and county funds totaling \$63,200 for three projects that will facilitate operations and efficiencies on site that include improvements in



irrigation technology and the remodeling and updating of a forage laboratory for greater safety and efficiency.

MCAREC and OSU Hood River County Extension facilities, sited on shared grounds, have benefited from a combined request of \$350,000 for Go Oregon funding to address capital construction and maintenance projects. These projects will facilitate operations and efficiencies on site, will provide ADA access to the station, and improved office and reception spaces. A number of long-deferred maintenance projects were resolved, and an innovative farm chemical storage facility with a rapid-escape safety egress, superior ventilation, and an adjacent rinsate pad also was completed.

EOARC, Burns benefited from \$248,000 in Go Oregon funds and an additional \$30,000 in other funding to improve station operations and efficiencies in these ways:

- Insulated, re-sided and repainted one lab building.
- Replaced overhead doors and refurbished the HVAC system, refurbished the interiors of other laboratory buildings.

### ***Healthy economy: Supporting economically viable production systems***

*Phytophthora* is a virulent fungal disease of plants; affected container nurseries especially have the potential for significant negative economic impacts. In response to identified stakeholder needs, **Jennifer Parke, Departments of Crop and Soil Science and Botany and Plant Pathology**, and **Richard Regan, North Willamette Research and Extension Center**, developed an online *Phytophthora* disease management training for nursery workers, so they can better identify and manage this important pest of commercial nurseries. The course is available at no cost through Extended Campus, or participants may pay to receive a certificate of completion and pesticide recertification credits. More than 50 individuals who completed the course received a Certificate of Mastery. While most participants are from Oregon, the course has wider application and international connections. Twenty-five wholesale nurseries in Oregon were represented as were government agencies, such as ODA's Plant Division. A pilot grower-assisted nursery inspection program administered by the USDA's Animal and Plant Health Inspection Service and ODA require that participating nurseries employ at least one person who holds a *Phytophthora* Training Certificate of Mastery. Several participant nurseries indicated that "I plan to change the way our nursery monitors for this disease." and "We will develop a new *Phytophthora* disease management strategy." A survey to evaluate the full impact of this program will be distributed during summer and fall 2009.

The entomology program at the **Hermiston Agricultural Research and Extension Center**, led by **Silvia Rondon**, has developed a strong research-extension agenda since September 2005, when Rondon was appointed. Rondon's program conducts basic and applied research and extension activities to address the immediate clientele needs in eastern Oregon with IPM approaches to common and emerging pest problems. This program has attracted almost \$1 million in federal and state funds. One of Rondon's principal projects addressed the potato tuberworm, a serious pest in Oregon, Washington, and other major potato-producing states. Through this project, Rondon has established long-lasting, collaborative relationships with regional entomologists. As of the close of fiscal year 2008-2009, research results have been widely disseminated to peers and stakeholders through a variety of venues. Other projects under Rondon's leadership include pests of grass seed and onions.

OSU **Integrated Plant Protection Center (IPPC)** posted the three PNW Pest Management Handbooks online in 1996 (Disease), 2001 (Weed) and 2002 (Insect). Access to these resources exceeded 1 million hits for the first time in 2007, with 325,204 users of the Insect Handbook, 281,032 users of the Weed Handbook, and 333,811 users of the Plant Disease Handbook. During its first full year online, the new IPPC website attracted 981,656 users. **Paul Jepson, director of IPPC**, says Center faculty are developing effective tracking methods for online resource use data. Access to the Center's online decision-support models all show increasing and accelerating use by a world-wide stakeholder group.

### ***Healthy economy: Disseminating scientific findings on a shoestring***

High cost and lag time between completion and release are serious drawbacks of conventional publishing of scientific books. Cost, especially, limits distribution of new works to selected libraries and individuals in the field. Thus, many members of the largest audience—students, post doctoral fellows, and many international scientists—have limited or no access to the most recent works. Neither do individuals with a more casual interest have convenient access. To partially address this problem, Bookshelf, a publishing arm of the National Center for Biotechnology Information (NCBI) of the National Library of Medicine, has adapted a number of books including textbooks and monographs for open access on the web [<http://www.ncbi.nlm.nih.gov/sites/entrez?db=books>]. These are books that previously have been published commercially, but the authors and the publisher have agreed to allow an open access version of the text on the Bookshelf web site. Aside from cost and availability, these internet publications are interactive and readily searched.

In a variation of this approach, NCBI has begun publishing books not previously available in print. The first of these is entitled *Baculovirus Molecular Biology*, written by **George Rohrmann, Department of Microbiology**. These stand-alone internet books have the additional advantage that they can be revised and upgraded regularly. In contrast to commercially published books adapted for open access on Bookshelf, a stand-alone open access book has no print copies available, although Portable Document Format (PDF) versions may be downloaded. Since the publication is open access, the author receives no payment for his efforts. It remains to be seen whether this will limit open access publishing. Whereas perhaps one can sympathize with publishers who may lose some textbook sales, students certainly will not be able to complain about their high cost!

## **Community and diversity**

In last year's report, we described a plan for 2008-2009 that would address various dimensions of community and diversity throughout the College. It anticipated a survey of student opinion, staff development training for unit leaders, and listening sessions with classified staff followed up by focused attention on issues identified in the listening sessions.

Such a pro-active approach requires intention, commitment, one or more "champions," and time available for structuring, leading, and managing organizational change. Events of the 2008-2009 academic year interrupted the work we had planned. Factors that distracted us from our intended systematic approach to developing an improved sense of community included:

- A 10-month search for a new dean and subsequent planning for transition,
- A recession of historic magnitude that led to significant mid-year budget reductions,

- A legislative session in which budgets for Statewide public services were at serious risk,
- Initiation of a series of conversations with faculty and staff about design and implementation of a new business center (in conjunction with the Hatfield Marine Science Center) to be operational in late summer 2010, and
- Implementation of anticipated additional budget reductions of 20 percent or more in the 2009-2011 biennium and beyond that will require the College to implement an initial fiscal transition and subsequent major structural transformation.

Although hiring was at a minimum, opportunities for aggressive recruitment of minorities and women did result in several new additions to our faculty. The College continued its partnership with the Office of the Provost in making possible another in the series of Conversational Skills workshops for staff and faculty. It was the College of Agricultural Sciences that initiated these workshops more than a decade ago to develop effective workplace skills and build productive relationships in the OSU community. Now almost 3,000 faculty, staff, and students have voluntarily participated. These workshops advance the values and practices the College this year had intended to foster through the listening sessions with classified staff.

OSU students brought home the top award from this year's national conference of Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS) in Indianapolis. Although the OSU chapter had previously won the regional award, this was their first time capturing the national Chapter of the Year Award, which came with a \$1,000 prize. The MANRRS chapter has its home in the College of Agricultural Sciences. In the competition, students from MANRRS chapters from around the United States submitted written reports and gave 30-minute presentations detailing the accomplishments of their chapter. Among the accomplishments of OSU MANRRS group was the annual "Wardrobe Makeover." This event, a partnership with Campbell's Cleaners and other student groups on campus, provides clean, gently used business clothes at low cost for students who will be facing job interviews and entering the business work force.

MANRRS is a national organization that involves students from grade school to graduate school in programs related to agriculture and natural resources. It reaches out to groups such as ethnic minorities, international students, and urban residents who may not have access to similar rural programs, according to faculty adviser **Wanda Crannell, Bioresources Research Program**. "If I had to describe MANRRS in one word, it would be 'mentoring,'" Crannell said. "It is a diverse student organization. Working together in a group where everybody's majors are different, and everybody's backgrounds are different, and accomplishing so much is certainly no small achievement."

### *Unit-initiated diversity efforts*

While every department actively promotes diversity, this year, we've chosen to spotlight the concerted efforts of the **Department of Fisheries and Wildlife**. This department excels in recruiting students from diverse backgrounds, and takes active measures to promote undergraduate retention.

**Dana Sanchez**, a new faculty member in the department, actively recruits students for diversity. For example, Sanchez:

- Engaged high school participants in a summer camp for Latino 4-H members about the College of Agricultural Science and about careers in natural resources.

- Serves as co-advisor with **Tiffany Garcia** for the department's student chapter of the Ecological Society of America. This organization actively supports recruitment of students from diverse ethnic backgrounds for careers in the sciences.
- Serves on the advising committee for Minorities in Agriculture, Natural Resources and Related Sciences, referred to elsewhere in this report.
- Developed an online version of FW255 Field Sampling, to be offered during the fall 2009.

Reviewed current issues in fisheries and wildlife as part of a field trip during the summer of 2009 for the Science and Math Investigative Learning Experiences (SMILE) program, which serves historically underrepresented and educationally disadvantaged students.

**Rebecca Goggans**, internship coordinator, is another member of the department who recruits for diversity. She is advisor for the online Fisheries and Wildlife degree. Last year Goggans initiated a mentoring program that pairs new students with current students. As part of this effort, the departmental student lounge now has a "Get Connected" bulletin board that promotes student engagement. A "Spotlight" poster, that changes every term, highlights a departmental student or faculty member.

With **Nancy Allen**, head advisor for the department, Goggans organized an international experiences workshop to encourage students to study abroad or investigate internships abroad. The two encourage students to apply for scholarships funded by the Oregon chapters of the American Fisheries Society and The Wildlife Society. Students may apply for internship credit to attend the annual meetings of these societies where they will have the opportunity to meet with potential employers. Allen and Goggans promote active student engagement with the Fisheries and Wildlife Club; all club events encourage relationship-building among students, faculty, and staff. Students serve on many departmental committees and are represented at faculty meetings and retreats.

## International activities and accomplishments

International activities in the College of Agricultural Sciences are varied, diverse, and fairly widespread across its units, but they are largely the product of independent faculty initiative rather than being part of a coordinated, planned effort at the College or University level. The College's international activities include research with strong international dimensions including bi-directional cross-border collaborations; leadership for a grant-funded worldwide aquaculture collaborative research support program; a World Agriculture course that provides students with opportunities to see food production in other nations; and individual faculty travel.

Among the top global issues the College is well-suited to study and address are:

- Hunger abatement, food security and safety, agricultural policy, and sustaining agricultural productivity;
- Water management and policy, availability, and quality;
- Environmental management and policy;
- Certain dimensions of climate change; and
- Certain aspects of renewable energy.

Two examples this year of the College's faculty international engagement are collaborative partnerships with colleagues in China that illustrate work underpinning in one case environmental management, and in the other, food safety. A third example included the training and

collaborative research activities of three visiting women scientists from Ghana, Niger, and Nigeria.

In the first example, **Staci Simonich, Department of Environmental and Molecular Toxicology**, gained national media prominence in summer 2008 for her work on a project led by Peking University to formulate a strategy to control air pollutants during the Olympic Games in China. Simonich, who studies how pollutants travel through the atmosphere, runs a laboratory that identifies and tracks chemicals, such as pesticides and particulate matter that ride airstreams starting in Asia and blowing across the Pacific Ocean to the western United States. In collaboration with Chinese counterparts, Simonich and her graduate students began air sampling in Beijing in 2007, devoting their attention to polycyclic aromatic hydrocarbons (PAHs) that are produced by burning carbon-based materials such as gas, coal, and wood. An American television crew covering the Olympics interviewed Simonich while she was carrying out her air-sampling work from a rooftop at Peking University.

A member of a National Academy of Sciences committee that studies pollutants entering and leaving the United States, Simonich is continuing collaborative work with Chinese counterparts examining the impact of burning fuels like coal and biomass on the health of residents in the United States and China. With Professor Shu Tao at Peking University, with whom she worked on the Olympics study, she will carry out research to help determine the cancer-causing potential of certain air masses—and where they came from. The scientists will collect air samples at multiple locations, including China, Japan, and several places in Oregon. Funding for this work comes from the National Institute of Environmental Health Sciences and the National Science Foundation.

The second example of international engagement of College of Agricultural Sciences faculty, also in China, focuses on food safety—and education as a tool to improve food safety. Two OSU faculty members led an integrated team of U.S. experts in food safety and distance learning technologies. They sought areas of common concern for which internet and digital learning modules could address critical matters of food safety training for China, where food safety has been an issue of great magnitude. **Dave King**, head of **Extension and Experiment Station Communications**, and **Robert McGorin**, head of the **Department of Food Science and Technology**, led this USDA Scientific and Technical Exchange team, jointly sponsored by the U.S. Department of Agriculture and the American Distance Education Consortium. The team focused on possible opportunities for future mutually beneficial collaborations to help ensure a safer food supply for the People's Republic of China and for the United States. They visited regional and local inspection facilities that focus on residues and food contaminants. They also met on university campuses, usually with food science faculty members, and with governmental organizations, including the China Center for Disease Control and Prevention. The team concluded there are outstanding opportunities for collaboration between the two countries including the development of online food safety courses, and for Chinese students and professionals to study food safety and food processing technologies at American universities, including Oregon State.

In a third example of international engagement, in 2008, the College of Agricultural Sciences hosted three senior women scientists through the **Norman E. Borlaug International Agricultural Science and Technology Fellows Program**. The program temporarily places agricultural researchers and policymakers from developing countries at universities and other institutions in the United States. The visiting fellows then receive scientific training and engage in

collaborative research that seeks to promote food security and economic growth in their countries. An agricultural economist from Ghana and two biochemists from Niger and Nigeria spent **even** weeks of training and research at Oregon State University working with mentors in Agricultural and Natural Resource Economics, Veterinary Medicine, and the Linus Pauling Institute to improve the diets, health and financial conditions of people in their countries. “This has been a valuable opportunity to build relationships and assist in the development of agricultural self-sufficiency in Africa,” said **Stella Coakley**, associate dean, who served as the principal investigator on the grant.

## ***Major recognition and awards***

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### **Faculty**

**James Carrington, Director of the Center for Genome Research and Biocomputing** was named a fellow of the American Phytopathological Society. Carrington has an extraordinary record for professional service, and he has mentored many graduate students and postdoctoral fellows, who have gone on to establish successful scientific careers. He has made pioneering contributions in plant virology, including co-discovery and subsequent work with viral suppressors of RNA silencing. Carrington also is a leader in RNA-based biology of plants; his work significantly altered our understanding of gene regulation in plants. Carrington was further honored with a Humboldt Research Award; he was nominated for the award by German scientist Detlef Weigel, Max-Planck-Institut für Entwicklungsbiologie. The award was conferred in recognition of Carrington’s lifetime achievements in research. Under the terms of the award, he has been invited to conduct a research project of his choice in cooperation with specialist colleagues in Germany.

**Joel Felix, Malheur Experiment Station**, was presented an Outstanding Reviewer Award at the 2009 Society of the Weed Science Society of America’s annual meeting. The award is given for excellence in reviewing for the three journals of the society. Only two such awards are given each year across all of the Society.

**Lisbeth Goddik, Department of Food Science and Technology**, is the recipient of the 2008 Vice-Provost’s Award for Strategic Impact. This Award recognizes Goddik’s significant accomplishments and partnership with the Oregon dairy industry to revitalize the dairy processing program at Oregon State University and her outstanding achievements in establishing an Artisan Cheese program.

**Hiram Li, Department of Fisheries and Wildlife**, received the 2008 Western Division American Fisheries Society Award of Excellence. This is the society’s most prestigious award, and recognizes sustained professional excellence.

**Carol Mallory-Smith, Department of Crop and Soil Science**, was named Outstanding Weed Scientist by the Western Society of Weed Science.

**Sujaya Rao, Department of Crop and Soil Science**, received the University of Minnesota Hodson Graduate Alumni Award. The award recognizes outstanding alumni of the Department of Entomology.

**David Williams, Department of Environmental and Molecular Toxicology**, was appointed to the Xenobiotic and Nutrient Disposition and Action Study Section, NIH. Such an appointment is

the highest recognition of stature in his field and brings recognition not only to himself, but also to OSU.

**JunJie Wu, Department of Agricultural Resource and Economics**, was appointed to a three-year fellowship with the Resources for the Future University Fellows program. RFF is a nonprofit and nonpartisan organization that conducts independent research on environmental, energy, natural resource and public health issues.

Five members of **Extension and Experiment Station Communications** received Gold Awards from their professional association, the Association for Communication Excellence in Agriculture, Natural Resources, and Life and Human Sciences, for excellence in writing, publishing, educational materials and photography. They are **Tiffany Woods, Peg Herring, Erik Simmons, Jeff Hino, and Lynn Ketchum**.

## Students

OSU students swept the awards at the 2008 Western Division American Fisheries Society, winning out over students from 13 western states and British Columbia. **Ben Clemens, Bill Brignon, and Alena Pribyl**, all of the **Department of Fisheries and Wildlife**, received awards for papers or poster presentations.

**Seth White**, doctoral student in the **Department of Fisheries and Wildlife**, received a Fulbright Award to conduct research in the Czech Republic on the fish community dynamics in regulated rivers of the Morava basin.

**Maria Zapiola, Department of Crop and Soil Science**, received first place in the graduate student poster contest at the March, 2009 Western Society of Weed Science Meeting. Zapiola's poster was titled, *Impact of Immersion Time and Water Temperature on Germination of Creeping Bentgrass Seed*. **Suphannika Intanon** received third place in the graduate student poster contest, and **Melody Rudenko** received second place in the oral paper contest.

**Camille Leblanc**, a doctoral student in the **Department of Fisheries and Wildlife**, won the Gerry FitzGerald Award for the Best Student Poster Paper at the 2008 Ecology, Ethology, and Evolution of Fisheries meeting.

**Melissa McKenney** received the Plant-Insect Ecosystem Section Undergraduate Award from the Entomological Society of America.

**Kimberly Skyrn, Entomology Program**, won second place in the doctoral poster competition and **Melissa Scherr** won second place in the doctoral paper competition at the Entomological Society of America Pacific Branch 93rd annual meeting.

**Matt Hawkyard, Department of Fisheries and Wildlife**, received a Fulbright Award to conduct research in Norway on the enrichment of vitamins within *Artemia* brine shrimp for feed to marine larval fish.

**Christina Murphy**, senior in **Department of Fisheries and Wildlife, International Degree**, and **University Honors College** received a Fulbright Award to conduct research at the ECIM Marine Laboratory in Las Cruces, Chile.

**Brooke Peterschmidt, Department of Horticulture**, received a Fulbright Scholarship to continue her education in Norway. Her interest is in plant breeding.

**Rachel Crowhurst, Department of Fisheries and Wildlife**, received a Natural Sciences and Engineering Research Council (NSERC) postgraduate scholarship. NSERC is the Canadian equivalent to the National Science Foundation.

## Results and outcomes

### *Performance on college-level metrics*

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Please see Appendix A for information provided by the Institutional Research office.

### *Leveraging resources*

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#### Initiatives to leverage state resources

##### *Supporting the OSU Capital Campaign*

The College of Agricultural Sciences met its capital campaign goal of \$36.5 million in February 2009. By the end of fiscal 2008-2009, the College had received over more than \$39.3 million in gifts, pledges, and private grants. An estate gift received in early July 2009 brought the College's total to more than \$40.5 million. Fiscal year 2008-2009 was the second best fundraising year in the College's history; \$6,873,982 in gifts and pledges were received as well as \$1,289,794 in private grants for a total of \$8,163,776.

**Todd Bastian**, OSU Foundation director of development, and **Jack Holpuch**, associate director of development, for the College of Agricultural Sciences, as well as deans and department heads must be acknowledged for their efforts toward these successes. OSU President Ed Ray further described the twin records as reflecting, "great research by outstanding faculty and the extent to which friends and alumni really believe in the wonderful work within the college. Well done and congratulations to all."

#### Initiative to improve administrative efficiencies

The College of Agricultural Sciences and Hatfield Marine Science Center (HMSC) together will constitute one of two business centers at OSU that will become operational in August 2010. This center will serve all units of the College (including the Department of Botany and Plant Pathology) and units located at the Hatfield Marine Science Center. The HMSC units include the Coastal Oregon Marine Experiment Station, Cooperative Institute for Marine Resources Studies, the Hatfield Marine Science Center itself, and the Marine Mammal Institute.

In planning for the change, **Jack Breen**, chief business officer for the College, and **Joel Colvin**, then business manager for HMSC led three forums for faculty and staff who have an interest and a stake in the new business center. The forums were convened at Hatfield Marine Science Center, by videoconference for participation from branch Experiment Stations, and on campus in Corvallis. Each forum covered characteristics of the center the College is commissioned to create, design criteria, information that will be key in making design decisions, and what this particular center might be like. Forum participants then offered further ideas or refinements for the design



and critiqued a process for moving ahead with design and implementation. The process then moved to “off-line” work by smaller groups of interested colleagues—work that is continuing through 2009 and 2010.

## **Appendix A: Institutional metrics for the College**

These metrics will be included in the next version of this report.