Lost Tides
What historical records can tell us about the future of the Columbia River Estuary

Lemelson Foundation Award
Lemelson Awards PSU Foundation $706K to support Oregon MESA invention education activities statewide.

Modernizing Stats Education
Dr. Jennifer Noll studies new methods of teaching statistics to non-mathematics majors.

StoneStable, Inc.
A startup company with close ties to PSU has plans to revolutionize how vaccines are delivered by breaking the cold chain.
The Next Generation of PSU

From the Urban Growth Boundary to the Transit Mall, EcoDistrict to Tillamook Crossing, Portland is a city that loves to plan.

Now Portland State University is also getting into the act, with a strategic planning process and the design of a comprehensive fund-raising campaign coming on the heels of the successful “ReThink PSU” educational innovation program.

From the perspective of Research and Strategic Partnerships (RSP), we have been reshaping the way grants and contracts are administered, technology transfer is carried out, compliance is maintained, and our major partnerships are organized and advanced. As you can see in the later sections of this Report, those initiatives are bearing fruit, as most of our research metrics are climbing.

In the five years I’ve been at PSU, our priority research themes have not changed dramatically: sustainability initiatives that explore Portland’s unique natural and urban environment; health and life sciences that reflect our strong relationships with the Oregon Health and Science University and various social service organizations; educational innovation that reflects longstanding partnerships with Portland Public Schools and our local community colleges; and entrepreneurial programs that take advantage of our region’s tech-fueled startup culture.

What HAS changed in this period, and what holds the most promise for the future of PSU, has been the arrival of an outstanding cadre of research-active junior faculty members. Several of these emerging research leaders are profiled in this edition of RSP’s Quarterly Review.

On the sustainability front, environmental engineer Stephen Talke applies a historian’s perspective to extract climate-related information from tide gauge records along the Columbia River dating back over 100 years.

Environmental biogeochemist Jennifer Morse is looking at the hidden carbon costs of “green” practices, like installation of urban bioswales and the establishment of an urban growth boundary, which may have higher ecological costs than previously thought.

Meanwhile, the strategic partnership between PSU and Portland General Electric is bearing both educational and research fruit, particularly in the area of power engineering.

In the health arena, you can read about Gerasimos Fergadiotis’s latest work to help diagnose and care aphasia, the debilitating loss of language that accompanies stroke and other brain injuries.

Finally, with the theme of transitions, we note that two of PSU’s top administrative leaders, Jennifer Allen and Mark Sysmsa, will be returning to their faculty roles after serving for several years as Director of the Institute for Sustainable Solutions and Associate VP for Research (AVPR), respectively. A search is currently underway for a new Director for ISS. RSP is happy to welcome Dr. Lisa Zurk from the Electrical and Computer Engineering Department as our new AVPR.

The one veteran in our line-up, Biology Professor Ken Sredman, is working with a local startup company to commercialize some of his discoveries that can make vaccines more effective in rural parts of developing countries.

In the educational research sphere, Jennifer Noll of the Mathematics and Statistics Department is developing innovative ways to get students excited about learning statistics.

Curriculum and Instruction faculty member Jean Aguilar-Valdez is exploring how closer dialogue with students from diverse backgrounds can increase their success in STEM (Science Technology Engineering and Math) courses.

Similarly, the Lemelson Foundation has given a large award to support Oregon MESA’s programs that work to get kids from under served communities targeted toward STEM careers.

What’s new in 2015 at PSU, our priority research themes have not changed dramatically: sustainability initiatives that explore Portland’s unique natural and urban environment; health and life sciences that reflect our strong relationships with the Oregon Health and Science University and various social service organizations; educational innovation the reflects longstanding partnerships with Portland Public Schools and our local community colleges; and entrepreneurial programs that take advantage of our region’s tech-fueled startup culture.

Lost Tides

1 A team of PSU faculty, high school teachers, and students are mining historical tide data to predict how natural and man-made changes will affect the Lower Columbia River Estuary.

Modemizing Statistics Education

3 Dr. Jennifer Noll recently secured a prestigious “CAREER” grant from the National Science Foundation to study new methods of teaching statistics to non-mathematics majors.

Aging in Place

5 In PSU’s Biomedical Signal Processing Lab, Professor Eric Wan uses the latest machine learning methods to address the fundamental goal of letting people “age in place” in their homes.

Addressing Aphasia

7 Assistant Professor Gerasimos Fergadiotis studies language processing and develops tools to diagnose aphasia and assess the efficacy of treatments.

K-12 Geography Education Gets $200K Boost

8 PSU’s Center for Geography Education in Oregon has received a large grant from the Oregon Community Foundation to improve geography education.

StoneStable, Inc.

9 Portland startup StoneStable, Inc. is using technology developed at PSU to greatly improve the effectiveness of vaccines.

The 2015 Cleantech Challenge

10 The Cleantech Challenge awards upon its third year.

PSU Among Princeton Review’s Top Green Colleges

10 PSU received high ranking from the Princeton Review’s assessment of the country’s top “green college” for the fifth year in a row.

The Hidden Cost of Going Green

11 In forthcoming studies, biogeochemist Jennifer Morse and her students will examine sources of greenhouse gas emissions in areas less well-known than tailpipes and coal burning power plants.

Lemelson Foundation Awards $706K to Oregon MESA

13 Oregon MESA receives a large grant to expand opportunities for Oregon students to participate in invention education and STEM-related activities.

Jennifer Allen, Angela Jackson Receive Orchid Award

15 PSU Jennifer Allen and Angela Jackson were celebrated for being among the city’s most influential women.

PSU + PGE: Powering the Portland Region

16 Take a look inside of one of PSU’s strongest Strategic Partnerships.

Listening to STEM Student’s Voices

17 Assistant Professor Jean Aguilar-Valdez works with students communities to address inequalities in science education.

Research Snapshot

18 Research & Strategic Partnerships quarterly report: Awards (18); Proposals (20); Expenditures (22); Publications (22); Doctoral Degrees Confirmed (24).
The system in safe, working order. Now, with the rise of both Power Administration, and other agencies have labored to keep this time, the US Army Corps of Engineers, the Bonneville Dam through metro Portland to the Pacific Ocean—is the section best known to those living in Northwest Oregon and Southwest Washington. Here, before its turbulent entry into the sea, the river is broad, calm, and easily navigable, the result of more than a century of engineering that produced irrigation, hydroelectricity, access to foreign and domestic markets, and recreation to millions of citizens on both sides of the 49th Parallel.

Lost tides

No natural feature so dominates the geography, economy, and quality of life of residents of the Northwest US as the Columbia River. Draining a watershed of over 250,000 square miles in seven states and two Canadian provinces, the river provides irrigation, hydroelectricity, access to foreign and domestic markets, and recreation to millions of citizens on both sides of the 49th Parallel.

The “Lower Columbia”—the 145 miles stretching from Bonneville Dam through metro Portland to the Pacific Ocean—is the section best known to those living in Northwest Oregon and Southwest Washington. Here, before its turbulent entry into the sea, the river is broad, calm, and easily navigable, the result of more than a century of engineering that produced dams, levees, dredged shipping lanes, and jetties. Throughout this time, the US Army Corps of Engineers, the Bonneville Power Administration has been charged to keep the system in safe, working order. Now, with the rise of both global temperatures and sea level they are asking whether their previous efforts will be sufficient to keep this critical fluvial thoroughfare operational.

Assistant Professor Stefan Talke and his colleagues in the Department of Civil and Environmental Engineering have long studied how man’s influence has shifted the Lower Columbia and other river systems from their natural state. Human- and naturally-induced changes are subtly reflected in wave behavior (e.g., the height of storm surges), tidal flows, bathymetry, water temperature and salinity. To figure out the past, present, and future functioning of these waterways, Dr. Talke has become an expert in the hydrodynamic processes and sediment transport in estuaries, rivers, and oceans. He combines historical research, field data collection, data analysis and computer modeling to unravel the stories implicit in past and modern records and reconcile how natural and man-made factors affect the environment.

“Dr. Talke’s work with Professor Jay put him on a trail that eventually led to a prestigious National Science Foundation Faculty Early Career Development ‘CAREER’ award. Dr. Talke received the honor for his proposal “Modeling 19th Century Estuaries to Address 21st Century Problems.” Funding from the award is financing the study of historical trends in sea level, tides, water temperature, and salinity in the Lower Columbia. Moreover, by embedding local high school teachers and underrepresented students in his research team, Dr. Talke’s project will develop curricular materials that will introduce a diverse set of secondary school students to the exciting applications of science and engineering in their own backyards.”

Throughout the Columbia River Basin over 470 dams store water for hydroelectricity, drinking, and irrigation. Sediment trapped behind dams and is no longer deposited at the mouth as it once was, affecting the depth of the estuary. In summer, the interplay changes between the river’s warmer fresh water and the ocean’s colder salt water, causing salinity to increase further upstream than ever before. The spring freshet, the yearly rise in stream level due to snow melt, occurs a month earlier on average, and at a 40% reduced magnitude compared to 100 years ago. The deep dredged shipping lanes affect how tides roll upstream as the river moves downstream. All of these factors place stress on the estuary, its marine and riparian environments, fish and wildlife habitats, and other characteristics.

Understanding how climate change and sea-level rise may further stress the system is critical to coming up with solutions to problems such as declining salmon populations. By deciphering the past of the Columbia River system, Dr. Talke, his colleagues and students hope to preview its future.

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During the five-year project, the team will take historical records discovered by Dr. Talke in places like the US National Archives and modify existing computer models to learn more about changes in the Lower Columbia. Using multi-decade time series of 19th century tidal and water temperature measurements in combination with 20th and 21st century data, the team will determine the natural variability in the river and establish historical baselines to better understand subsequent changes. Their work will also explore hydrodynamic processes, assess trends in water temperature, and predict the estuary’s future.

“Because of those records,” Dr. Talke said, “we’re really starting to gain interesting insights into things we just couldn’t see before. We’re beginning to understand more about the system’s sensitivities and we can make better predictions about what the Columbia River Estuary might look like in the future.”

Assistant Professor Stefan Talke, Civil & Environmental Engineering

The archives contain records that date back as far as about 1850 in Oregon. For example, tides, water temperature, and climate were measured continuously in Astoria from 1853 to 1876, while Portland was still a village.

There was a lot of detective work involved in finding those records,” Dr. Talke said. “But when I uncovered them, it was like coming upon a treasure trove of data that could expand by decades the horizon of time in which we can study the estuary.”

The estuary we observe today is largely the result of building on the river that began in 1885 with the construction of the south jetty at Clatsop Spit near Astoria. Upstream of its confluence, the river is now hemmed in by levees, and the controlling depth has doubled in some places from about eight meters to approximately 16 meters. Much of the flood plain has been reclaimed for human use.

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"Lake Wobegone, where...all the children are above average."

If any of those "Prairie Home" children eventually come to Portland State University, Assistant Professor Jennifer Noll wants to make sure they learn enough statistics to understand how nonsensical that famous quote is.

Data collection and statistical analysis are critical parts of all science. They are also essential components of everyday decision-making. Recent advances in visualization and modeling software now make it easier to perform those kinds of tasks without being a statistical expert. Given the deluge of data we now generate and consume on a daily basis, the arrival of tasks without being a statistical expert. Given the deluge of data statisticians work with," Dr. Noll said. "Meanwhile, modeling statistical problems, visualizing, and representing information—the curriculum must be modernized. Her statistical reasoning and thinking skills. Dr. Noll will refine the CATALST coursework using data visualization and modeling software and conduct a comprehensive study of how students develop and later retain skills essential to statistical thinking and reasoning.

“When I first heard about the CATALST project, I was excited to try it in one of my classes,” Dr. Noll said. “The software we used to make models really gave the students the chance to explore ideas of statistical inference in ways that were so much more engaging than memorizing and performing procedures in textbooks. The level of engagement was apparent when we saw that six months after the course a majority of the students still understood the lessons they had learned and many had even used the software in other classes.”

Dr. Noll was impressed with how students responded to the CATALST program but thought the original materials were too structured. Curious, she let the students create their own models to figure out what the data meant without the aid of lesson plans.

“I’m really interested in looking at what can be done with those materials when we remove all the directions and let the students engage with the modeling software. There is a lot we can learn about teaching statistics, about the student learning experience, and about how students develop an understanding of modeling statistical problems, visualizing, and representing data in meaningful ways,” Dr. Noll said.

"Facts are stubborn things,” Mark Twain wrote, “but statistics are pliable.” Over the next five years, Dr. Noll’s project will address the stubborn fact that current methods and materials used to teach college statistics to non-mathematics majors need to be modernized. During that time she expects some 400 students will take one of the statistics courses she or her graduate students will offer.

Statistical literacy is an important skill set for students in a large number of disciplines, from sociology and psychology to engineering and chemistry. More broadly, it is a skill that all of us need as data consumers. Responding to this gap, community colleges and universities are greatly expanding their statistical course offerings. Dr. Noll’s work will improve the value of such courses, increasing the odds that the students will have “above average” statistical skills.
function generators, computers and flat-panel, high-resolution monitors. It is a "makerspace"—a venue where ideas become tangible and are then tested to prove their functionality. The sensor Samin is working with may eventually become a critical component of a wireless device tasked with monitoring an individual’s activity, how frequently they move from place to place, their breathing, or even their heartbeat.

Samin works in the Biomedical Signal Processing Lab in PSU’s Department of Electrical and Computer Engineering. The Lab’s director, Research Associate Professor Eric Wan, is an electrical engineer with expertise in statistical signal processing and machine learning. He is also an Adjunct Associate Professor in the Biomedical Engineering Department at Oregon Health and Sciences University (OHSU). He is well known for developing algorithms used in guidance and navigation systems. Google has applied his work to its driverless cars, while NASA has used it to direct Mars rovers.

Recently, Dr. Wan’s research has shifted to biomedical applications. He and a former Ph.D. student who now works at the lab's school have formed a startup company, MotioSens, which is developing remote sensing technologies that track and measure the movement of older adults who live alone in assisted living facilities.

Biomedical signal processing uses software to analyze electronically-recorded health information that our bodies regularly broadcast in order to gather vitals clues about an individual’s overall well being. It is a powerful tool for early detection, diagnosis, and management of diseases, as well as critical care. With MotioSens’ technology an array of sensors can easily be installed throughout an older adult’s home to collect data on that person’s movements: which room they’re visiting and when, how long they stay in each place, sleeping patterns, and more. Software capable of learning patterns and recognize anomalies can then process these data—that if a person fails to exist a room they usually spend little time in; or someone who normally wakes at six a.m. doesn’t get out of bed one morning. The smart machine would catch the change in behavior and send a notification to a physician, caregiver, friend, or family member. The receiver of the message could proceed from there.

“I think this is a great technology to lend peace of mind to older adults living alone and their families,” Dr. Wan said. “The sensors, which attach to walls and floor boards, gather information on general trends: the number of trips someone has made to their bedroom; the time and duration of their visits to the kitchen. If the software recognizes something out of the ordinary, a call will go out directly to the family or caregiver.”

According to Dr. Wan, the MotioSens monitoring system is unlike anything else on the market. There are wearable technologies that track mobility, but they only work if users wear them regularly and keep the batteries charged. Video cameras are another option, but they raise privacy issues, particularly when a third party records and stores the data. Infrared remote sensing has been around for over 30 years, but is inaccurate and produces data at too low a resolution to be useful. Other technologies like Bluetooth beacons are useful for monitoring activities like opening a pillbox or refrigerator, but do not communicate information about mobility. MotioSens, on the other hand, uses low-power RF sensors that plug into outlets throughout the house. The sensors signal to each other, creating an invisible sensing network. Disruptions and changes in the RF patterns are then used to determine a person’s location, walking speed, and other information.

MotioSens’ suite is the only unobtrusive, high-resolution monitoring system that tracks an individual’s movement through space and time and employs machine learning to determine if there is a need of assistance.

Dr. Wan said the next step is to improve the system’s ability to identify when there is more than one person in a room. By recognizing and tracking individuals within a group, the system could also provide important information about social interactions and other influences on an older adult’s mental as well as physical health. In the Lab, students like Samin are evaluating hardware and software that may soon make it possible to extract additional information about people in a room, such as their body stature and gender.

Dr. Wan’s work in the Biomedical Signal Processing Lab is just one example of how researchers at PSU are leveraging university assets like its high-tech engineering facilities, close partnership with OHSU, and throngs of eager and inquisitive students, to enter into health and health-related fields usually associated with medical schools. With the number of older adults in Oregon and across the nation increasing rapidly, remote sensing techniques will become increasingly important to how individuals, their families, and healthcare providers monitor and maintain their health and lifestyle. Already tested in Portland at locations like the Mirabella Continuing Care Retirement Community, and recognized as a finalist in the Oregon Entrepreneur Network’s 2015 Angel Oregon Competition, the technologies developed at PSU, MotioSens, and Dr. Wan are positioned to provide comfort and peace of mind to older adults who want to live independently.
In the award-winning film *The Theory of Everything*, neurodegenerative disease robs cosmologist Stephen Hawking of his ability to speak, just as he is discovering some of the deepest workings of the Universe. The cruel irony of this enforced silence, and Hawking’s ability to overcome it with a prosthetic device, provides much of the story’s dramatic power. Our second line of research investigates the ways healthy, older adults process language. If someone can’t do all these things, there might be a problem.

Dr. Fergadiotis’ hypothesis is that there are mediating circumstances involved in how older adults process language. To learn more he’s questioning the role psychosocial factors play in our ability to communicate coherently. Do social ties and activities—like talking regularly with friends or family, or going places and doing things with others—mitigate the effects of aging on language processing? If so, is there a way to qualitatively and quantitatively show what they do in reproducible studies? Answering such questions is a critical step along the path to extending the ability to communicate coherently well into later life.

For individuals who have had a stroke or other traumatic brain injury, regaining the ability to effectively communicate begins to decline in our late 60s and early 70s.”

“We are looking for in the language samples from neurotypical, older adults,” Dr. Fergadiotis said, “is how well each sentence relates to the overall theme of what is being communicated. The ability to produce coherent discourse requires specific parts of the brain to work in unison. When telling a story or providing an opinion, a speaker needs to remember information in sequence. They have to choose the correct words. They need to maintain focus and attention. All of these factors have to come together to produce meaningful language. If someone can’t do all these things, there might be a problem.”

Dr. Fergadiotis explained, “When someone takes the GRE, the software is assessing the line of questioning based on the answers provided. We are creating algorithms that apply the same principles to diagnosing cases of aphasia. The test responds to the patient’s ability level, which saves time, aggravation, and improves patient outcomes.”

According to Dr. Fergadiotis, their software can cut the number of questions in an assessment from 175 to 30. “Thus far their success rate is 99 percent as effective as the longer test. These promising results prompted them to submit a grant proposal to the National Institutes of Health to move the project into the next phase of testing and development.”

Now in his third year at PSU, Dr. Fergadiotis is part of a growing cluster of faculty from departments including Speech and Hearing Sciences, Applied Linguistics, Electrical and Computer Engineering, the Graduate School of Education, and the School of Social Work, all addressing issues related to interpersonal communication. Whether developing methods to diagnose aphasia, measuring the efficacy of interventions and treatments, or creating innovative technologies to augment how communication is carried out, these researchers are laying groundwork for a more integrated approach to how we connect with one another through language.

Oregon K-12 Geography Education Gets $200K Boost

By John Kirkland

“Computer adaptive testing is the operating principle behind the Graduate Records Examinations and similar tests,” Dr. Fergadiotis explained. “When someone takes the GRE, the software is assessing the line of questioning based on the answers provided. We are creating algorithms that apply the same principles to diagnosing cases of aphasia. The test responds to the patient’s ability level, which saves time, aggravation, and improves patient outcomes.”

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In the award-winning film *The Theory of Everything*, a neurodegenerative disease robs cosmologist Stephen Hawking of his ability to speak, just as he is discovering some of the deepest workings of the Universe. The cruel irony of this enforced silence, and Hawking’s ability to overcome it with a prosthetic device, provides much of the story’s dramatic power.

Addressing Aphasia

In the award-winning film *The Theory of Everything*, a neurodegenerative disease robs cosmologist Stephen Hawking of his ability to speak, just as he is discovering some of the deepest workings of the Universe. The cruel irony of this enforced silence, and Hawking’s ability to overcome it with a prosthetic device, provides much of the story’s dramatic power.
During last year's Ebola outbreak, the world's attention was riveted on how quickly a new vaccine could be developed. But an equally crucial question is how existing vaccines can be delivered successfully to rural areas that lack good roads or access to refrigerated vehicles.

StoneStable, Inc., a Portland-based startup company, plans to use technology developed by PSU biology professor and virologist Ken Stedman to address the issue of vaccine wastage. According to a World Health Organization report, over fifty percent of all vaccines are wasted, mainly due to a lack of refrigeration. As biological products, vaccines must be transported at controlled temperatures. If at any time the “cold chain” between production and the final destination is broken, the vaccine quickly becomes ineffective. Yet in many parts of the world, particularly in developing and underdeveloped countries, keeping vaccines cold during transport is impractical, if not impossible. StoneStable believes the solution is to remove refrigeration from the equation.

In a 2013 *New York Times* article about his discovery that certain viruses could be “frozen” in silicon dioxide (silica) and later reanimated unharmed, Professor Stedman quipped, “It’s hard to put a fridge on the back of a donkey.” Dr. Stedman reasoned that if you could suspend a virus in a coating of silica and later return it to its original state, you could do the same with vaccines, no refrigerator needed. That is what StoneStable is still in the early phase of testing and developing the technology, but according to Dr. Stedman, the lab tests have been promising. In the long run, he and the rest of the team would like to apply their methods to other biologicals: proteins and other molecules known for being notoriously difficult to transport.

If the World Health Organization is going to reach its global vaccination targets, it will need new ways to more easily and cheaply get these fragile compounds to the populations that need them. The obvious way to achieve that aim is to break the cold chain. By moving innovations developed at PSU by Dr. Stedman from lab to market, StoneStable, Inc. seeks to make that happen.

StoneStable is in line with the WHO’s Global Vaccine Action Plan, which aspires to deliver vaccinations to all who need them.

“The in this first phase, we’re really focusing on applying our techniques to the influenza vaccine,” Dr. Stedman said. “Here is a vaccine that is highly unstable and really important to public health anywhere you go in the world. The flu kills hundreds of thousands every year. With better ways of getting vaccines to people we could really lower that number.”

PSU among PRINCETON REVIEW’S TOP GREEN COLLEGES

Portland State University was ranked among the top environmentally responsible colleges and universities, coming in at No. 11 among 353 institutions studied by *Princeton Review*.

Portland State was lauded for its civic engagement and commitment to sustainability. Student quotes in the profile listed in the *Princeton Review Guide to Green Colleges* released April 16 praised the university for its wealth of classes and passionate instructors.

*Princeton Review* bases its green rating on data PSU submits to the Association for the Advancement of Sustainability in Higher Education for its ongoing Sustainability Tracking, Assessment & Rating System (STARS). Portland State has a STARS Gold rating.

Portland State University is also listed on the 2015 Green Honor Roll assembled by *Princeton Review* for receiving the highest possible score on the Green Ratings tally.

According to the *Princeton Review’s methodology website*, “Out of the 2,000 schools we considered for this project, the Top 50 Green Colleges (not to mention the 300 others that are profiled in our guide) are, in our opinion, truly up to the task of training the next generation of leaders, who will be responsible for putting green ideas into practice.”

PSU student comments featured in the *Green College Guide* profile include the statement that Portland State is “a green-minded urban school” that’s “training students to be good community members.”
Environmental leaders of the 1960s and ’70s had a relatively easy task—find pollution and eliminate it.

The sustainability movement of the past two decades, which tries to balance ecological, economic, and equity goals, faces much tougher challenges. Many seemingly “green” solutions turn out to have unanticipated financial, social or environmental costs.

Consider Oregon’s landmark urban growth boundaries established in the 1970s to protect agricultural lands from suburban sprawl. While proximity allows farmers to deliver their produce to Portland and Eugene with relatively modest fuel costs and carbon emissions, scientists now recognize that when fertilizer applied to those nearby fields reacts with groundwater, it can lead to serious greenhouse gas emissions. That’s where projects I’m currently developing are focused.

Now in her second year at PSU, Dr. Morse is developing two projects related to “unconventional” sources of greenhouse gases. Normally, when we think about emissions that contribute to global warming, carbon dioxide is what first comes to mind. While CO₂ accounts for the bulk of greenhouse gases entering the atmosphere, others including methane and nitrous oxide also have significant effects. The principal source for both these gases turns out to be agriculture.

In 2004, a large portion of the southern Willamette Valley was found to have groundwater nitrate concentrations above what is considered safe for drinking. Dr. Morse is currently planning to join Oregon’s Department of Environmental Quality and the Environmental Protection Agency in an effort to reverse both terrestrial and atmospheric nitrate contamination, while also providing carbon credits for farmers.

“As a part of the plan to reduce nitrate contamination, the EPA and DEQ have been studying how the ways farmers fertilize their fields influence nitrate pollution,” Dr. Morse said. “But not all of the fertilizer that gets sprayed onto the fields ends up in the same place. Some finds its way into ground water, some is absorbed by the plants, and some remains in the soil where interactions with the microbial biome turn it into nitrous oxide, a greenhouse gas. So my role in the project will start with looking at how farmers use fertilizer—the quantity they’re applying, when they’re applying it, and the methods of distribution.”

With that information, Dr. Morse and her students will be able to run lab experiments to investigate the biogeochemical processes that occur when nitrogen fertilizer comes in contact with soil microbes to produce nitrous oxide (N₂O). The project could show a correlation between how, when, and by what method farmers fertilize their fields and the subsequent amount of N₂O released into the atmosphere. By changing practices to reduce those N₂O levels farmers may qualify for carbon credits.

According to Dr. Morse, if the program is successful, it will benefit both the environment and farmers. Furthermore, if carbon credits become available, they might incentivize farmers elsewhere to fertilize their crops in ways that reduce the amount of greenhouse gases entering the atmosphere due to agricultural practices. In the long run, the program might serve as a model for other regions of the US where the overuse of nitrogen fertilizers is affecting air and water quality.

Back in Portland, Dr. Morse and her graduate students are thinking about another possible source of greenhouse gas emissions—bioswales. Bioswales are landscaped areas along roads, in parking lots, and sidewalks that are engineered to perform like wetlands: natural filters that remove harmful substances from runoff before it flows into rivers, creeks, and aquifers. In cities like Portland, bioswales are transforming the appearance of the cityscape, creating streets bordered by garden-like greenspaces. But as Dr. Morse notes, when viewed biogeochemically, bioswales may not be so benign.

“My students are really excited to take a close look at bioswales to see if there’s any relationship to greenhouse gas emissions,” Dr. Morse said. “We want to learn exactly what kinds of microbes live in the soils and what they’re doing. It could mean using molecular techniques to figure out the microbial community composition and how it responds to events like rain, spikes in pollutants, and other disturbances. I think it’s an exciting opportunity to look into something we don’t yet know that much about.”

Many members of the Portland State community come here because of the opportunity to live in one of the greenest cities in the country. Sustainability scientists like Professor Morse and her graduate students get the added bonus of being able to closely examine their unique urban environment and figure out how it can be made even healthier in the future.

The Hidden Cost of Going Green

In two forthcoming studies, biogeochemist Jennifer Morse and her students will examine sources of greenhouse gas emissions that are less well-known than tailpipes and coal-burning power-plants.
The Lemelson Foundation Awards
$706,000 Grant for Oregon MESA

By Julie Rutherford

The Lemelson Foundation has awarded a grant totaling $706,000 to the Portland State University Foundation to support Oregon MESA (Math Engineering Science Achievement) statewide invention education activities that build on science, technology, engineering and mathematics (STEM) skills. The new grant expands the work of the MESA program to help underserved youth pursue math-based higher education and STEM-related careers by providing a proven mix of pre-college academic, hands-on experience, and mentoring opportunities for K-12 students. This work is vital to the continued growth of Oregon’s innovation-led economy and efforts to ensure that all Oregonians can share in the state’s growing prosperity.

“The Lemelson Foundation’s expanding partnership with Oregon MESA represents our deep commitment to invention in our home state,” said Carol Dahl, executive director of The Lemelson Foundation. “MESA’s work is critical to advancing invention education. It gives young people more creative confidence, unleashes their thinking about ways to advance positive change, and maximizes their personal potential. That leads to a smarter, stronger Oregon.”

The Lemelson Foundation grant gives a significant boost to Oregon MESA’s mission of increasing the number of members of underserved populations in STEM-based employment, a cornerstone for invention and innovation. Both The Lemelson Foundation and Oregon MESA understand that the key to preparing a 21st Century workforce is a strong base in STEM, combined with the ability to identify real-world problems and turn ideas into meaningful solutions.

Need for Invention Education and STEM Skills Oregon

Students from underserved communities in Oregon lag behind in their exposure to invention education and STEM, making them less likely to pursue related university degrees and careers. The gap is even more pronounced for girls and underrepresented minorities.

These populations are missing important opportunities to share in the excitement and prosperity of Oregon’s burgeoning technology sector. According to the Technology Association of Oregon, the state’s technology industry has been the most productive in the US in terms of GDP for the past decade, and wages for workers in the technology industry are double the state’s average. The economic vibrancy of Silicon Forest and similar industry clusters was built by the kind of innovative talent and skills that Oregon MESA helps foster.

“The impact of The Lemelson Foundation’s grant in fostering invention through greater access to science, technology, engineering and mathematics is tremendous,” said David Coronado, executive director of Oregon MESA. “Thanks to the generosity and vision of the Foundation, Oregon MESA’s mission of creating education and career success for underserved students is more powerful than ever.”

Solution

The new grant will allow Oregon MESA to expand its reach to different parts of the state and build opportunities for students to participate in invention and STEM-based activities during the school day. The Lemelson Foundation, a long-time partner of Oregon MESA, has awarded the grant in recognition of MESA’s strong track record of success.

About Oregon MESA

Established in 1989, Oregon MESA’s mission is to provide students underrepresented in the fields of mathematics, engineering, science and technology with the skills, knowledge and opportunities to develop their talents, explore technology-based careers, enter college and compete successfully in the workforce. Oregon MESA is supported by Portland State University, school districts, industry, and community organizations, foundations and individual donors. For more information, visit oregonmesa.org.

About The Lemelson Foundation

Based in Portland, OR, The Lemelson Foundation uses the power of invention to improve lives. Inspired by the belief that invention can solve many of the biggest economic and social challenges of our time, the Foundation helps the next generation of inventors and invention-based businesses to flourish. The Lemelson Foundation was established in the early 1990s by prolific inventor Jerome Lemelson and his wife Dorothy, and is celebrating its 20th Anniversary throughout 2015. To date the Foundation has made grants and other investments totaling more than $185 million to hundreds of organizations around the world. For more information, visit lemelson.org.
PSU’s Jennifer Allen and Angela Jackson Among the City’s Most Influential Women

By Laura Gleim

Two of Portland State’s most influential leaders, Jennifer Allen and Angela Jackson, have been honored with 2015 Women of Influence Orchid Awards from the Portland Business Journal.

The Orchid Award recognizes the region’s most influential women professionals with strong records of innovation, outstanding performance in their fields, and meaningful contributions to their communities. Nominations for the award were judged on three criteria: professional accomplishments, community leadership, and awards and milestones.

More than 300 influential women were nominated this year, but only 25 were selected to receive the prestigious award. The awards ceremony was held on April 16 at the Hilton Hotel in downtown Portland.

Jennifer Allen, director of PSU’s Institute for Sustainable Solutions and associate professor of Public Administration, was recognized for her many years of leadership and service in entrepreneurism, for her pursuit of a more just, prosperous, and vibrant future for communities locally and globally.

Under her leadership at the Institute, the Portland State Sustainability Solutions has become a nationally recognized leader in sustainability research and education. Over the past seven years, the Institute has supported the development of PSU’s Green Building Research Lab to advance market-oriented building green innovations, a program to deploy life-saving household water filters and clean burning cookstoves to 25 percent of the poorest families in Rwanda, a comprehensive legislative report on the feasibility of a carbon tax for Oregon and a city-university partnership to advance research and action on Portland’s Climate Action Plan.

“I’m honored to receive this award and glad to accept it on behalf of my wonderful colleagues at PSU’s Institute for Sustainable Solutions and partners throughout the campus and in the community. Any influence I may have had is largely due to the great people I have the opportunity to work with,” Allen said.

Angela Jackson, director of PSU’s Business Accelerator and co-director of the Portland Seed Fund, was selected as the Orchid Award Entrepreneur of the Year for her contributions to a vibrant entrepreneurial scene in Portland. With Jim Huston, Jackson co-founded the Portland Seed Fund, which invests in early-stage companies. The fund was an early backer of Globe Sherpa, a mobile technology company that grew out of a project by PSU MBA students and now enables smart mobile phone TiMfer ticket purchases for thousands of Portlanders. Jackson also oversees the PSU Cleantech Challenge, a contest to support the development of earth-friendly innovations that is expanding its reach Portland-wide this year, and the PSU Business Accelerator, which was recently selected as the Business Accelerator of the Year by the National Business Incubation Association.

Jackson spoke on a panel after the awards ceremony with the three other women executives of the year selected in their respective business categories: nonprofit, small/medium company, and large company. She talked about her years working as a sailor on tall ships, where she learned the true meaning of leadership. “When you can do what you’d do yourself through others without even touching the wheel—that is leadership, that is success,” she said.

And she offered some final words of advice for finding career success: “Say yes. Then figure out how to do it later.”

The energy landscape in the United States is shifting dramatically. Global climate change, aging infrastructure, and volatile crude oil and natural gas prices – coupled with the cost and complexity of extracting fossil fuel from unconventional deposits like tar sands and oil shale – has caused energy providers and consumers alike to seek new, smart, and environmentally sustainable energy technologies and methods for homes, businesses, and vehicles. Across the nation, states have enacted legislation that requires a percentage of all demand for electricity to be met by renewable generating sources such as wind, solar, bio- and geo-thermal. In Oregon, the State Legislature enacted the Oregon Renewable Energy Standard in 2007, which stipulates that the state’s largest utilities provide 25 percent of their retail sales of electricity from newer, clean, renewable sources of energy by 2025. Portland and the greater Northwest are host to a large and diverse energy industry at the cutting edge of this movement.

In 2010, Portland State University and Portland General Electric formed a Strategic Partnership to advance regional economic development goals related to renewable energy and urban sustainability. The partnership showcases PSU and PGE as anchor institutions and innovators in clean technology, research, practice and workforce development. Through a joint portfolio of activities including faculty and student research, workforce preparation, demonstration projects, and conferences, PSU and PGE are making strides towards advancing the region’s leadership in smart grid technology, transportation electrification, and renewable energy.

“The PGE-PSU Strategic Partnership demonstrates what can happen when regional anchor institutions align goals and priorities,” said Erin Flynn, Associate Vice President for Strategic Partnerships at PSU. “Together, we are building an energy workforce pipeline that prepares next generation engineers. Through development of an integrated curriculum cross-training hands-on learning, academic training and real work experience, the partnership is meeting regional demand for energy employees.”

By Laura Gleim

Congratulations to Susan Hill Long and Emily Kendall Frey on receiving 2015 Oregon Book Awards. Susan Hill Long is adjunct instructor in PSU’s Book Publishing program. She received the 2015 Oregon Book Award for Children’s Literature for her middle-grade novel Whistle in the Dark. Emily Kendall Frey teaches creative writing at PSU and PCC. She received the Stafford/Hall Award for Poetry for her work Sorrow Arrow.
Listening to STEM Students’ Voices

Portland State University’s leadership in science, technology, engineering, and mathematics (STEM) education derives from at least four ingredients: strong community connections, commitment to university access for a diverse student body, partnership with our region’s public schools, and a robust pipeline of graduates to Oregon’s high-tech industry.

The value of these efforts at PSU has recently been affirmed by large research and training grants from the National Institutes of Health and the Howard Hughes Medical Institute, both of which seek to expand the number of minority students entering STEM disciplines and going on to careers in health care and the sciences.

Many STEM programs assume that the main limit on minority success is access and affordability. The implication is that if bright students from diverse backgrounds could simply get admitted to existing programs and given assistance through financial aid and academic coaching, their paths forward would be clear. But what if the barriers to matriculation include the ways minority communities are perceived by STEM instructors, and how STEM programs are being designed?

These are among the complex questions Dr. Jean Aguilar-Valdez, a recent addition to the PSU faculty, is exploring. Her scholarship complements the university’s long-standing practice of engaging in community-based, participatory research as well as its wide-ranging endeavors to elevate STEM education for all students. An assistant professor in the Department of Curriculum and Instruction in the Graduate Division of Education, Dr. Aguilar-Valdez draws on her own experience as a Latina, student, scientist, feminist, and advocate for the young people who share so much with her and make the research possible. She leverages the strengths of each of those roles to push back against injustice and inequality in the education system and in society at large.

“One way I am able to achieve that push back in the research I do is to help the young people I work with elevate their voices,” said Dr. Aguilar-Valdez. “In their own words they relate the injustices they’ve experienced and highlight things so often overlooked because of the narrow view of science and education so many educators have: their culture, history, and traditions; the incredible knowledge they possess, and the beauty of who they are.”

As one of the newest members of the large community of STEM researchers at PSU, Dr. Aguilar-Valdez is trying to use her students’ perspectives to shed light on the underlying cultural assumptions that may serve as barriers to diversifying the scientific and health care workforce.

“By the time we are in college, we have already decided what we want to be in life,” Aguilar-Valdez continued, “so you’re not going to be able to just come along and say, ‘You want to be a scientist because you can create solutions for problems.’ Students have to be passionate about it, and equally, they need to have realistic expectations about what they can achieve. They need to feel that if bright students from diverse backgrounds could simply get accepted to college and earn a Master’s degree in physics, I had something to impart to students about science and success. But teaching science at a bilingual Title I middle school in East Los Angeles, I quickly learned that the students, the majority of whom were Latino, had a lot to teach me. Their experiences with issues like documentation and immigrants’ rights opened my eyes to a wider world. That humbled me and I realized that I needed to become involved with the social justice movement in education.”

Dr. Aguilar-Valdez is constantly asking how her research benefits the students and communities she works with. She acknowledges that she walks between worlds in her many roles as a Latina, an academic, an educator, and activist. “In their own words they relate the injustices they’ve experienced and highlight things so often overlooked because of the narrow view of science and education so many educators have: their culture, history, and traditions; the incredible knowledge they possess, and the beauty of who they are.”

When I began teaching, I thought that because I was a Latina and an educator I could make a difference. But teaching science at a bilingual, Title I middle school and earning a Master’s degree in physics, I realized that I had something to impart to students about science and success. But teaching science at a bilingual Title I middle school in East Los Angeles, I quickly learned that the students, the majority of whom were Latino, had a lot to teach me. Their experiences with issues like documentation and immigrants’ rights opened my eyes to a wider world. That humbled me and I realized that I needed to become involved with the social justice movement in education.”

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Andersson, Timothy; Bass, Robert; Garrick, Wilf; Jettes, Antonie; Tufts, Kristin. TIMSS32 Platform for Accelerating Synchrophasor Analysis, Bonneville Power Administration; $339,993; MCECS, New

Anderson, Sonja; Jhaj, Sukhwant; Van Der Schaaf, Hans; eThink PSU; Association of Public and Land-Grant Universities; $275,000; OAA, Amendment

Ballhorn, Daniel. The Impact of Symbiotic Nitrogen Fixation on Plant Defense, Herbivores and Higher Trophic Levels, National Science Foundation; $166,473; CLAS; Award for student research

Baney, William. Washington State Systems of Care Expansion Consultation, Substance Abuse and Mental Health Services Administration; $872,509; SSW; Amendment

Berenley, Lauren. USAHC Moul of the Columbia River Facility & Case Studies, US Army Corps of Engineers; $58,358; CUPA; New

Burns, Scott. That Un-Certain Thing: Estimating Basal Geometry Uncertainties Important to Projections of Thwaites Glacier Dynamics, National Aeronautics and Space Administration; $363,669; CLAS; Amendment

Cahn, Katharine. Family Connection Grants: Family-Finding/Family Group Decision Making, Department of Health and Human Services; $500,000; SSW; Renewal

Cahn, Katharine; Leadership Academy for Middle Managers, Department of Health and Human Services; $139,406; SSW; Renewal

Cellarius, Karen. Council on Undergraduate Research in Psychology, Department of Health and Human Services; $180,000; SSW; Amendment

Curry-Stevens, Ann. Chronic Student Abstinence Study, Oregon Education Investment Board. $139,406; SSW; New

Daescu, Dacian; Adaptive Optimization of Parametric Error Covariance Models in Variational Data Assimilation, Naval Research Laboratory; $163,284; CLAS; Amendment

This text section describes Dr. Jean Aguilar-Valdez’s work and research at Portland State University. Her focus is on understanding the experiences and perspectives of students from diverse backgrounds in STEM education and how these experiences can inform and improve STEM teaching. The text highlights the importance of understanding cultural assumptions that may serve as barriers to diversifying the science and health research workforce. Dr. Aguilar-Valdez’s research involves using students’ perspectives to shed light on these cultural assumptions and to push back against injustice and inequality in education. The text also notes the multiple roles she plays, including as a Latina, an academic, an educator, and activist, which she uses to advocate for the young people she works with. The research aims to elevate STEM education and make it more accessible to students from diverse backgrounds.
Daim, Tugrul; NW Energy Efficiency Technology Roadmap Bonneville Power Administration; $650,011; MCECS; Amendment
Deardorff, Pam; Professional Development System, Standards, Support; Department of Health and Human Services; $878,558; GSE; Amendment
DeRivera, Catherine; Ruiz, Greg; BAPID: A Rare Opportunity to Examine the Hydro Effect Resulting from Intensive Harvest of an Introduced Predator, National Science Foundation; $71,416; CLAS; New
Elliott, Debra; Oregon Gambling Persuasion Study Phone Survey; Administration for Children and Families; $600,000; SSW; New
Elliott, Debra; Cellarius, Karen; Miracles/Family Recovery Support Regional Partnership Grant - Program Evaluation; Administration for Children and Families; $600,000; SSW; New
Gaines, Eleanor; Western Stormy Flower Management and Nest Protection for 2015; US Fish & Wildlife Service; $253,914; CLAS; New
Gopalakrishnan, Jay; Novel DPG Method for Wave Propagation; US Air Force; $86,051; CLAS; Amendment
Keller, Tom; Evaluation of Monitoring Enhancement Demonstration Projects; US Department of Justice; $93,044; SSW; Amendment
Lafrenz, Martin; Bliss Ketchum, Leslie; DeRivera, Catherine; Biodiversity Corridors (Phase 3); Metro; $25,000; CLAS; New
Larsen, Sean; Progressing through Calculus; National Science Foundation; $523,086; CLAS; New
Lawson, Holly; National Leadership Consortium in Sensory Disability; US Department of Education; $153,275; GSE; Amendment
Liberty, Robert; Walton, Judy; Accelerating Local Implementation of the Sacramento Region Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS); Sacramento Area Council of Governments; $352,000; CUPA; New
Margodhiani, Hamid; Portland State Climate Change Streamflow Dataset; Bonneville Power Administration; $577,550; MCECS; Amendment
Noll, Jennifer; CAREER: Transforming College Students’ Statistical Thinking: Data, Technology & Modeling; National Science Foundation; $193,021; CLAS; New
Orellana, E. Roberto; Cellarius, Karen; Oregon Caring Connections Initiative, Substance Abuse and Mental Health Services Administration; $312,800; SSW; New
Palleoni, Sergio; Sacramento Neighborhoods Project; Sacramento Area Council of Governments; $100,000; COTA; New
Pankow, James; Water-Quality Research for the National Water-Quality Assessment Program - A Multi-Year Intervention; US Geological Survey; $209,960; MCECS; Amendment
Podrabsky, Jason; Graduate Research Fellowship Program: Fellow—Claire Riggs; National Science Foundation; $69,500; CLAS; New
Rockhill, Anna; Safer Futures; Department of Health and Human Services; $61,479; SSW; New
Rosenstiel, Todd; Proposal for Preliminary Quantification of Total VOC Fluxes; Greenwood Resources; $63,837; CLAS; Amendment
Rousseau, Daniel; Zark, Lisa; Mid-Frequency Propagation Modeling Using the Wavelength Invariant; Office of Naval Research; $279,999; MCECS; Amendment
Strongin, Robert; Building on Success: Pacific Northwest Louis Stokes Alliance for Minority Participation (Phase 2); National Science Foundation; $217,350; OAA; New
Sysma, Mark; Joint Program for Collaboration and Cooperation in Research, Education, and Outreach; US Geological Survey; $1,584,080; RSP; Amendment
Sysma, Mark; Zebra and Quagga Mussel Monitoring in the Columbia River Basin; Bonneville Power Administration; $149,969; CLAS; Amendment
Talke, Stefan; Improving Estuarine Transport Models Using Satellite Measurements (1); Office of Naval Research; $311,340; MCECS; Amendment
Talke, Stefan; Improving Estuarine Transport Models Using Satellite Measurements (2); Office of Naval Research; $345,503; MCECS; Amendment
Talke, Stefan; CAREER: Modeling 19th-century Estuaries to Address 21st-century Problems; National Science Foundation; $105,091; MCECS; New
Teuscher, Christof; A Stochastic Inference Model based on Probabilistic Bit-Streams; National Science Foundation; $515,827; CLAS; Amendment
Tobias, Andrew; SOUND - SAFE on Untrusted Network Devices; Defense Advanced Research Projects Agency; $515,375; MCECS; Amendment
Walker, Janet; Collaborative Research: Advantages and Impacts of a Multi-scale Wind Farm; National Science Foundation; $284,807; MCECS
Walker, Janet; Technical Assistance Network for Children’s Behavioral Health (TA Network) Task 8; Substance Abuse and Mental Health Services Administration; $239,506; SSW; Amendment
Walker, Janet; Technical Assistance Network for Children’s Behavioral Health (TA Network) Task 8; Substance Abuse and Mental Health Services Administration; $58,402; SSW; Amendment
White, Dia; Person-centered Care Measure in Adults Foster Care; Oregon Department of Human Services; $72,719; CUPA; New
Zaron, Edward; Improving Coastal Marine Gravitation; National Geospatial-Intelligence Agency; $219,750; MCECS; Amendment
Zark, Lisa; Analysis of Eigenspace Dynamics with Application to Army Office; Army Research Office; $341,598; MCECS; Amendment
Deardorff, Pam; Professional Development System, Standards, Support; Department of Health and Human Services; $878,558; GSE; Amendment

View the complete list of proposals at: pdx.edu/research/university-research

Looking for funding? Find opportunities at: pdx.edu/research/funding-opportunities

Ancit, Tina; The Clinical Rehabilitation Counseling Education Program (CRCEP); US Department of Education; $998,650; GSE
Anderson, Timothy; Bass, Robert; Garrick, Will; Jetter, Antonie; Tiaffe, Kristin; Open Source Framework for Accelerating Sparse Tensor Analysis; Bonneville Power Administration; $339,993; MCECS
Barney, William; Washington State Systems of Care Expansion Consultation, Substance Abuse and Mental Health Services Administration; $443,471; SSW
Bliss-Ketchum, Leslie; DeRivera, Catherine; Monitoring Effectiveness of the Luna Butte Wildlife Cruising Measures; Oregon Department of Transportation; $261,764; CLAS
Britell, Scott; Delambre, Lois, III; Small Weaving Quick Draw Semantics into the Web; National Science Foundation; $515,827; MCECS
Buckley, Brad; Cellular Life and Death in the Cold: Apoptosis and DNA Damage in Antarctic Fish; National Science Foundation; $767,246; CLAS
Cal Santiago, Raul E; Collaborative Research: Advantages and Impacts of a Multi-scale Wind Farm; National Science Foundation; $284,807; MCECS
Campbell, Chris; Investigating Indigent Defense: Client Rights, Client Satisfaction, and (Mis)perceptions of the ‘Public Pretender’; Department of Justice; $472,310; CUPA
Chen, Zhiqiang; Jiao, Jun; Hugo, Richard; Johannson, Erik; Koenekamp, Rolf; NNIC: Enabling Nanoeducation Technology and Research Nationalwide via Portland State University’s Self-Sustaining Center for Electron Microscopy and Nanofabrication; National Science Foundation; $8,679,583; CLAS
Chang, Heejun; Podrabsky, Jason; Rosenstiel, Todd; Fink, Jonathan; Kelly, Kirk; CC&DNI Networking Infrastructure: Research and Innovation Network for PSU; National Science Foundation; $500,000; CLAS
Comer, William; Russian Flagship Center Renewal, US Department of Defense; $239,000; CLAS
Daim, Tugrul; NW Energy Efficiency Technology Roadmap, Bonneville Power Administration; $1,593,192; MCECS
Deardorff, Pam; Professional Development System, Standards, Support; Department of Health and Human Services; $878,558; GSE

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Research Snapshot

Selected Proposals Q3

Selected Awards Q3

View the complete list of awards at: pdx.edu/research/university-research

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Research Snapshot

Proposals by Quarter

Third Quarter, Fiscal Year 2015

Proposals Submitted Q3

Looking for funding? Find opportunities at: pdx.edu/research/funding-opportunities

Ancit, Tina; The Clinical Rehabilitation Counseling Education Program (CRCEP); US Department of Education; $998,650; GSE
Anderson, Timothy; Bass, Robert; Garrick, Will; Jetter, Antonie; Tiaffe, Kristin; Open Source Framework for Accelerating Sparse Tensor Analysis; Bonneville Power Administration; $339,993; MCECS
Barney, William; Washington State Systems of Care Expansion Consultation, Substance Abuse and Mental Health Services Administration; $443,471; SSW
Bliss-Ketchum, Leslie; DeRivera, Catherine; Monitoring Effectiveness of the Luna Butte Wildlife Cruising Measures; Oregon Department of Transportation; $261,764; CLAS
Britell, Scott; Delambre, Lois, III; Small Weaving Quick Draw Semantics into the Web; National Science Foundation; $515,827; MCECS
Buckley, Brad; Cellular Life and Death in the Cold: Apoptosis and DNA Damage in Antarctic Fish; National Science Foundation; $767,246; CLAS
Cal Santiago, Raul E; Collaborative Research: Advantages and Impacts of a Multi-scale Wind Farm; National Science Foundation; $284,807; MCECS
Campbell, Chris; Investigating Indigent Defense: Client Rights, Client Satisfaction, and (Mis)perceptions of the ‘Public Pretender’; Department of Justice; $472,310; CUPA
Chen, Zhiqiang; Jiao, Jun; Hugo, Richard; Johannson, Erik; Koenekamp, Rolf; NNIC: Enabling Nanoeducation Technology and Research Nationalwide via Portland State University’s Self-Sustaining Center for Electron Microscopy and Nanofabrication; National Science Foundation; $8,679,583; CLAS
Chang, Heejun; Podrabsky, Jason; Rosenstiel, Todd; Fink, Jonathan; Kelly, Kirk; CC&DNI Networking Infrastructure: Research and Innovation Network for PSU; National Science Foundation; $500,000; CLAS
Comer, William; Russian Flagship Center Renewal, US Department of Defense; $239,000; CLAS
Daim, Tugrul; NW Energy Efficiency Technology Roadmap, Bonneville Power Administration; $1,593,192; MCECS
Deardorff, Pam; Professional Development System, Standards, Support; Department of Health and Human Services; $878,558; GSE
Selected Proposals Q3

View the complete list of proposals at: pdxs.edu/research/university-research

Research Snapshot

Expenditures by Quarter

Research Expenditures Q3, 2015

Q3 Publications

View the complete list of publications at: pdxs.edu/research/university-research

This partial list of publications contains articles by PSU faculty published between Jan. 1, 2015 and March 31, 2015. The list was generated by Web of Science citations, were provided by Google Scholar. The list is alphabetized by lead author listed on individual publications. PSU authors are listed in boldface. You can see the full list of faculty publications here. If you published a paper between January and March that does not appear in the Quarterly Review, email publication information in APA format to rpcom@pdxs.edu.

Donaldson, Amy; Bank, Lewis; Steele, Joel. Socialite: Effects Of A Family-Based Social Communication Intervention For Children With ASD. National Institutes of Health. $3,674,889. CLAS

Feng, Wu-Chi; Fighozari, Miguel; Liu, Feng; VEC. Medium: Collaborative Research: Large-Scale Visual Computing From World Wide Data Streams. National Science Foundation. $780,001. MCECS

Feng, Wu-Chang; Liu, Feng. VEC. Small: Online Dynamic Walkthrough. National Science Foundation. $641,011. MCECS


Graneq, Elise; Nieder, Pincus, Max; Strecker, Angela. Contaminants of Emerging Concerns in Pacific Oyster: Examining Landscape Drivers and Waterways Effects on Larval Survival and Settlement; National Oceanic and Atmospheric Administration. $229,681. CLAS

Holz, Andreas. Blue Mountain App-Based Old-Growth Forest Conservation Implementation; US Fish & Wildlife Service. $124,214. CLAS

James, Keith; Standard Grant: Scientific and Indigenous Research Methodology For Indigenous Communities; National Science Foundation; $399,981. CLAS

Jones, Trevor; Scheller, Robert. Merging LIDAR and Hyperspectral Imagery to Assess Forest Composition, Structure, and Health; National Aeronautics and Space Administration. $460,649. CLAS

Karavanic, Karen. TWQ. Small: System Infrastructure for SMaHRT Real-Time Integrity Management; National Science Foundation; $424,552. MCECS

Liu, Feng; Fung, Wu-Chi; Wu-Chang. TWQ: Small: Privacy for Multimedia in the Cloud; National Science Foundation; $500,000. MCECS

Liu, Feng; Li: Small: Visual Plausibility: Perception, Metrics, Techniques, And Applications; National Science Foundation; $479,900. MCECS

Luo, Linda; Portland State University Student Support Services; US Department of Education; $1,792,730. OTHER

MacArthur, John; McNiel, Nathan; Dill, Jennifer. Equity Outcomes and Potential for Better Bike Share; People for Bikes. $74,996. OTHER

Megler, Veronika; Maier, David. Ill: Small: Ranked Search of Scientific Datasets; National Science Foundation. $415,883. CLAS

Messer, Lynne. Burden of Cumulative Environmental Exposures and Racial Disparities in Cancer Outcomes; National Institutes of Health; $230,124. CUPA


Moradkhani, Hamid; Karavanic, Karen; Daescu, Dacian. CyberSEES: Type 1: Cyber-Enabled Ensemble Data Assimilation For Drought Monitoring And Recovery; National Science Foundation. $399,591. MCECS

Morse, Jennifer. Collaborative Research: Biogeophysical Trade off in Urban Biocycles Under Contrasting Regional Climate; National Science Foundation; $270,780. CLAS

Newson, Jason. Racial and Ethnic Differences In Social Influence Processes That Affect Physical Activity To Later Life; National Institutes of Health. $5,423,333. CUPA

Perkins, Robert; Sireek, Martin. The Role of Early Post-Depositional Alteration in Distribution and Long-term Mobility of Act and Other Non-Volatile Elements in Ash-Flow Tuff; National Science Foundation; $392,036. MCECS

Ragabani, Rahel. Small RNAs That Promote Intracellular Growth Of Coxiella Burnetii; National Science Foundation. $1,923,458. CLAS

Ranaranarivelo, Shankar. Therapeutic Skin Surfactants; National Institutes of Health. $148,500. CLAS

Rosemeister, Todd. Urbanization Impact On OCIGN Forests - Biogeophysical Implications of Disappearing canopy Epiphytes; Department of Energy. $433,211. CLAS

Schumacher, Thomas. CyberSEES: Collaborative Research: Cyber Civil Infrastructure Management via Collaborative Mobile Imaging and Reconstruction; National Science Foundation; $253,213. MCECS

Sharma, Rajiv; Mitra, Arnab. Effects of Smoking Stigma on Racial/Ethnic, Sex and Income-Based Disparities in Access to Primary Care Physicians; National Institutes of Health; $1,828,899. CLAS


Singer, Jeffrey. CUL 3 E3 Ligase Regulation Of Mammalian Gland Development; National Institutes of Health. $1,786,777. CLAS

Singh, Sushant. NSF: Small: Wireless Reusable Permanent Tag for Objects; National Science Foundation; $118,838. MCECS


Toumi, Christof. SHP: Small Biological Reservoir Computing; National Science Foundation; $499,882. MCECS

Thienhuis, Eva. Collaborative Research: Digital Instructional Material in Probability and Statistics for Elementary/Middle School Preinister Teachers; National Science Foundation; $116,935. CLAS

Vassilevski, Panayot. Space-Time Discretizations Enabling Parallel-in-Time Simulations; Army Research Office; $328,829. CLAS

White, Diana. Investment for Senior and Mental Health Specialists; Oregon Health Authority. $370,000. CUPA

Woods, Mark. Towards the National Design of MRI Contrast Agents: Four Tuning Water Exchange; National Institutes of Health; $1,567,788. CLAS

Xie, Fei. STARSS. Small: Design for Enforceable IP Block Assurance; National Science Foundation; $499,999. MCECS

Zurik, Lisa. Actes Senior; US Department of Defense; $30,000. MCECS
Q3 Publications

View the complete list of publications at: pdx.edu/research/university-research

Research Snapshot

Doctoral Degrees Conferred, Winter 2015

Remal Hasin Abotah, Ph.D.
Dissertation title: Tugrul Daim, MCECS

Aasha Barve, Ph.D.
Dissertation Chair: Robert Strongin, CLAS
Dissertation title: Development of an Optical Method for the Detection of Homocysteine as a Disease Biomarker Using Fluorescein-Aldehydes

Gregory Alan Bostrom, Ph.D.
Dissertation Chair: Andrew Rice
Dissertation title: Modifications to a Cavity Ringdown Spectrometer to Improve Data Acquisition Rates

Joseph Patrick Schwartz Fitzgerald, Ph.D.
Dissertation Chair: Rolf Koenenkamp
Dissertation title: Alteration Corrected Photomission Electron Microscopy with Photons Applications

Carl William Foreman, Ph.D.
Dissertation Chair: Neal Wallace
Dissertation title: Impact of a State Evidence-Based Practice Legislative Mandate on County Practice Implementation Patterns and Inpatient Behavioral Health Discharge

Matthew Robert Holdgate, Ph.D.
Dissertation Chair: Deborah Duffield
Dissertation title: Applying GPS and Acceleometers to the Study of African Savannah (Locavonta africana) and Asian Elephant (Elephas maximus) Welfare in Zoo

Calleen Anne Kidney, Ph.D.
Dissertation Chair: Eric Mankowski

James R. Laidler, Ph.D.
Dissertation Chair: Kenneth Stedman
Dissertation title: Palaeobotanical and Ecological Impacts of Virus Silicification

Dong-Joon Lim, Ph.D.
Dissertation Chair: Tim Anderson
Dissertation title: Technological Forecasting Based on Segmented Rate of Change

Jennifer Cullen Loomis, Ph.D.
Dissertation Chair: Robert Liebman
Dissertation title: Astrist Doctors: Explaining Physician Activism in the Oregon Movement for Single-Player HealthCare

Mersiha Sipahic McClaren, Ph.D.
Dissertation Chair: Loren Lutzenhiser
Dissertation title: Energy Efficiency and Conservation Attitudes: An Exploration of a Landscape of Choices

Hamed Moftakhar Rostamkhani, Ph.D.
Dissertation Chair: David Jay
Dissertation title: A Novel Approach to Flow and Sediment Transport Estimation in Estuaries and Rivers

Maureen Ray, Ed.D.
Dissertation Chair: Danelle Stevens
Dissertation title: School Culture and the Affective Learning Needs of Latino Long-term English Learners

Dora Madeline Raymaker, Ph.D.
Dissertation Chair: Wayne Wakeled
Dissertation title: Interruptions of Critical Systems Thinking and Community Based Participatory Research in Developing a Web Site for Autistic Adults

Jennifer Rae Rineer, Ph.D.
Dissertation Chair: Donald Truccillo
Dissertation title: Supporting the Working Force: The Impact of Psychosocial Workplace Characteristics on Employees’ Work Ability

Cheryl Wang, Ph.D.
Dissertation Chair: Carl Wamser

Jiale Wang, Ph.D.
Dissertation Chair: Robert Strongin
Dissertation title: Facile Methods for the Analysis of Lysophosphatidic Acids in Human Plasma

Research Snapshot


Murphy, M. T.; Chutter, C. M.; Redmond, L. J. (2015). Quantiﬁcation of avian parental behavior: What are the minimum necessary sample times? Journal Of Field Ornithology, 86(1), 41-50. CLAS


View the complete list of publications at: pdx.edu/research/university-research