Fall 2014

Portland State
UNIVERSITY

Research & Strategic Partnerships

Quarterly Review

Research & Strategic Partnerships
Quarterly Review, Volume II, Issue I

Portland State
UNIVERSITY

Research & Strategic Partnerships

Jonathan Fink
Vice President,
Research & Strategic Partnerships

Mark Sytsma
Associate Vice President,
Research

Erin Flynn
Associate Vice President,
Strategic Partnerships

Alan Kolibaba
Assistant Vice President,
Research

Lorraine McConnell
Director,
Office of Research Integrity

Dawn Boatman
Director,
Sponsored Projects Administration

Joe Janda
Director,
Innovation & Intellectual Property

Portland State
UNIVERSITY

Portland State UNIVERSITY

Research & Strategic Partnerships
Quarterly Review

Fall, 2014

Jonathan Fink

Contents

"Back at PSU, we…"

I used to have a colleague, dean of Business at Arizona State University, who would start many of his sentences with "Back at Wharton, we..." It was incredibly tiresome. So I know the risks of touting one's past to describe the present. But it's also shortsighted to not learn from one's experience.

I was reminded of this by the exhilarating news about EXITO, PSU's largest-ever federal grant, awarded by the NIH to a team headed by Professors Carlos Crespo and Tom Keller. In the next decade, EXITO will help hundreds of underrepresented students enter the health science workforce, assuring that patients see caregivers whose backgrounds more closely reflect their own. This alone is worthy of celebration.

But the winning of this $24M grant (with a possible $20M extension) also demonstrates our growing maturity as a research university. It highlights the assets we can best leverage, and the systems we put in place to aid our faculty's creative efforts. This Review includes a press release about the award and an interview with Carlos and Tom about some lessons learned.

EXITO takes advantage of earlier grant-funded partnerships between PSU and community colleges, and dozens of collaborations between PSU faculty and OHSU counterparts. It also reflects PSU's close historic ties with social service organizations, Keller's unique "Center for Interdisciplinary Mentoring Research" (on which previous administrators placed a large financial bet), and our well-funded efforts in STEM education. Crespo's personal knowledge of his native Puerto Rico's status as an offshore U.S. protectorate sensitized him to the lack of opportunities available to students from Pacific Island Territories. The major upgrades we've made to PSU's research administrative services also played a role.

Back at ASU, one grant marked a similar turning point. In 1997, the NSF picked a team of natural and social scientists to create a Long Term Ecological Research (LTER) program to study interactions between Phoenix and its underlying ecosystem. That program, funded at roughly $1M a year, has run continuously for 17 years. It showed ASU's faculty (and NSF) that they were in a new, more competitive league. It led directly to more than a dozen other multimillion-dollar, interdisciplinary awards exploring different aspects of rapid urbanization. Further, it spawned other grants in fields as diverse as bioengineering, archeology, and fine arts.

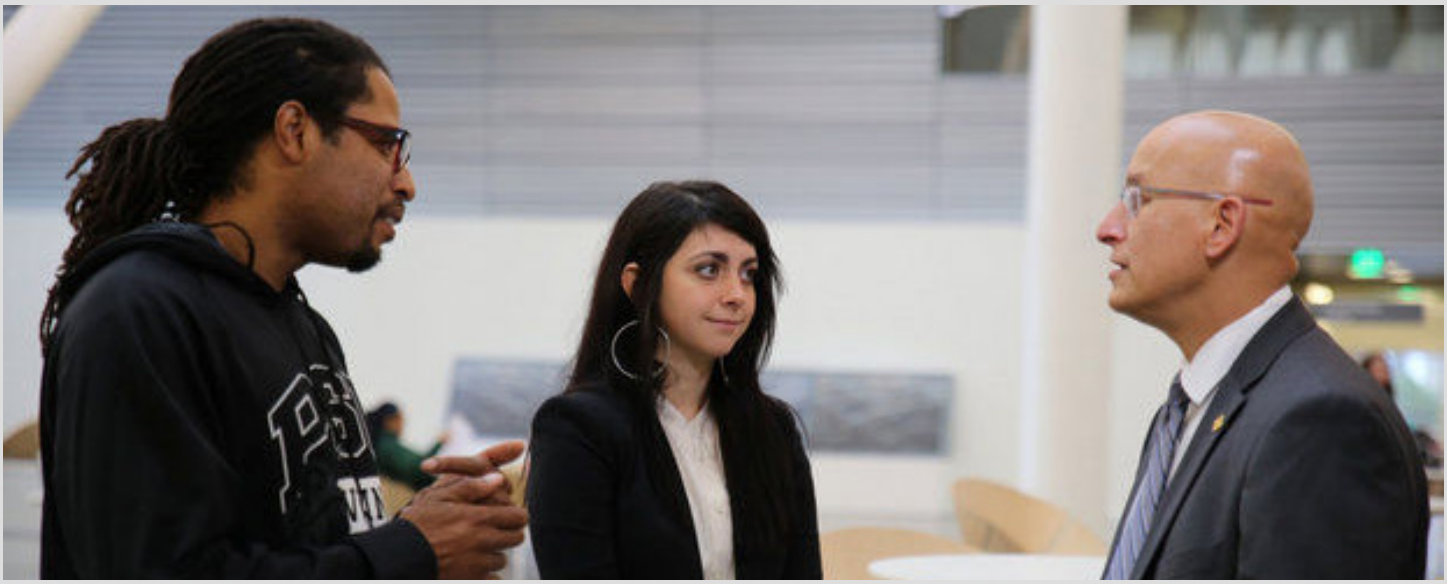
EXITO can similarly mark an inflection point for PSU's research culture, amplifying our accomplishments in urban-based community engagement and public health, and confirming to Metro Portland how large an asset a first-class research university can be.

Besides EXITO, this Review describes other connections among PSU, society's needs, and innovation: engineer Evan Thomas's public health program in Rwanda, chemist Steve Reichow's protein research in the Collaborative Life Sciences Building, environmental historian Catherine McNeur's look back at urban agriculture in New York City, the "My Life" mentoring program for foster teens, and "Reclaiming Futures" interventions that help at-risk kids avoid incarceration.

This rich storehouse of outstanding partnership-based scholarship will allow future administrators to tell their colleagues "Back at PSU, we…"

Jonathan Fink, Vice President
Research & Strategic Partnerships

PSU Receives $24M Federal Grant to Diversify the Health Science Pipeline



Alan Keyes (left) and Catalina Urrutia-Jorde (right) and project director Carlos Crespo meet at the new Collaborative Life Sciences Building.

PSU has won a $24 million research and training grant from the National Institutes of Health (NIH) to help underrepresented and diverse students pursue careers in biomedical, behavioral, social, or clinical research and other health sciences. The funding will support students of Hispanic, African American, American Indian, Alaska Native, and Pacific Islander heritage as well as students with disabilities, histories of foster care or economic disadvantage.

"We're looking at an incoming freshman class that's 42 percent students of color," said Wim Wiewel, president of PSU. "Never before has there been such a robust program to create opportunities for underrepresented students to pursue degrees in health sciences."

The money will fund PSU's new Enhancing Cross-disciplinary Infrastructure Training at Oregon (EXITO) program. Students accepted to the program will receive scholarships, stipends, mentoring, summer seminars, paid job experience, and dedicated academic and financial aid advising—essentially, everything a student would need to be successful.

Carlos Crespo, project director, is excited about this innovative model to train the next generation from underrepresented backgrounds. "This program provides wrap-around support throughout the year," said Crespo. "By working with our partners, it creates a pathway for success whether they start at PSU or transfer in." PSU is collaborating with Oregon Health and Science University (OHSU), Portland Community College, Chemeketa Community College, Clackamas Community College, Clark College, University of Alaska, University of Hawaii, University of Guam, American Samoa Community College and Northern Marianas College.

The PSU grant is part of a larger $240 million investment by the NIH to develop new approaches that engage researchers, including those from backgrounds underrepresented in biomedical sciences, and prepare them to thrive in the NIH-funded workforce. PSU is one of 10 primary institutions selected through this initiative, which ultimately supports 50 institutions through partnerships. The awardees will establish a national consortium to develop, implement, and evaluate approaches to encourage students to pursue biomedical careers.

"In addition to the hard work and creativity of our lead investigators, PSU's ability to win this major award was enhanced by our extensive collaborations with OHSU, and by recent investments in our research infrastructure," said Jonathan Fink, VP of Research and Strategic Partnerships. "As has been shown repeatedly around the country, a single large grant like this has the power to transform universities. We look forward to building on this terrific accomplishment."

"Diversifying our health and science workforce is critical in ensuring all communities receive culturally competent care and service," said Leslie Garcia, M.P.A., OHSU's assistant chief diversity officer and director for their Center for Diversity & Inclusion. "To that end, OHSU and PSU have worked together for many years on multiple fronts to increase opportunities for diverse and underrepresented students. Funding from the NIH will allow us to further embolden our efforts in building a pipeline to enhance diversity of the scientific community focused on biomedical, behavioral, social, and clinical disciplines."

*Source: Scott Gallagher, University Communications

EXITO—How PSU Faculty and Staff Landed the Largest Award in University History

Winning a major award like EXITO does not happen in a vacuum. Recently, EXITO team leaders Carlos Crespo, Thomas Keller, and Kay Logan sad down with RSP's Jon Fink and Shaun McGillis to talk about preparing a proposal that could stand out in a field of strong contenders from major research universities and medical schools around the country.

RSP: *How did you begin to approach the proposal process?*

Carlos Crespo [CC]: *Because of previous projects, like* **Portland Bridges**, *we knew how to run pilot programs and what it would take to incentivize and bring on partners. [The "Bridges to Baccalaureate" program is a partnership between PSU and Portland Community College that helps students from underrepresented groups prepare for careers in the biomedical, behavioral, and health sciences.] We were also very inclusive. We invited the usual people to planning meetings, but also invited others from departments like chemistry, biology, sociology, psychology, the Institute on Aging, urban planning and environmental studies. Most are doing research related to health in one way or another, either directly or indirectly. Involving such a diverse group helped us solidify our ideas. I think it is fortunate that there are so many faculty members at PSU willing to come together and collaborate on projects such as this.*

Thomas Keller [TK]: *Our goal was to identify as many interested folks as we could from acros the university. That was possible largely because of the infrastructure and personnel built into the* **Center for Interdisciplinary Mentoring Research** **[CIMR].** *Since the center was launched in 2010 we have done a lot of outreach to connect people all over campus. So through CIMR, a network was already in place. And we had Kay [Logan], the center's Coordinator, who was essential to the planning and development of the proposal process.[CIMR was competitively selected in 2010 to receive pilot funding by the Provost's office and RSP.]*

RSP: *Nine schools from around the Pacific region and 56 faculty members, program managers and evaluators have partnered on this project. How did you build this extensive network?*

TK: *It started with OHSU. I knew and had worked with* **Cynthia Morris**, *who is the Assistant Dean in the School of Medicine at OHSU and who has also been very involved in mentoring. Then there were the community colleges Carlos had been involved in with the Bridges project. The institutional connections we had, the working relationships with people in those institutions were very important to forging those partnerships.*

CC: *It is always a good practice to build partnerships with people you know, trust, and enjoy working with. In this case, it was just as important to bring a diverse group of students from community colleges to the table. And so through the connections we had with people we knew at PSU and at OHSU and through traveling to places in the Pacific, we brought on community colleges in Alaska, Hawaii, Guam, Mariana, and Samoa.*

KL: *And that whole time we did as much work as we could to help our partners through the proposal process. That was one of the challenges involved—reviewing all the contracts and subcontracts, drafting a scope of work for everyone, putting together budgets. It was like writing a series of grant proposals and bundling them into one very large package. But it was key to getting all the necessary pieces into place.*

RSP: *What are some of the other factors you attribute to the success of the proposal?*

TK: *One of the things that helped get this proposal off the ground was that we knew we had to stand out, be distinctive and highlight our strengths. NIH was looking for something really innovative, transformational. We had to make the case that PSU could do something interesting and novel.*

Continued on the following page.

Part of that was Carlos's plan to take a Pacific approach and draw diverse student populations from places like Alaska and the Pacific islands. I think another key element for us was to emphasize PSU's strong general education model. Early on we made the decision to root the program in University Studies.

The University Studies model opens the program up to a broad range of incoming freshman and transfer students. Rather than just targeting those students in departments traditionally associated with health sciences, we could draw from entering students who took a Freshman Inquiry course and got interested. It seemed a natural way to attract students who wouldn't otherwise be exposed to health sciences. The University Studies model allows us to be very inclusive and to draw students with a variety of perspectives into the health sciences. Yes, there'll be the biology and chemistry students, but we'll also have students who bring "social determinants of health" perspectives. I'd say another factor in our success was PSU's extensive experience with transfer students. We built the model so we could incorporate transfer students from the community colleges in Alaska and the islands.

Dr. Thomas Keller

RSP: *So the team was being opportunistic, stitching together resources from around the university to prepare a compelling proposal?*

CC: *Right. We had our knowledge from previous projects and our ongoing partnership with OHSU and local community colleges to leverage. People we knew and had worked with over the years. CIMR. University Studies. The Pacific perspective. And then programs like the one Laurie Powers and Sarah Geenen have been working on,* **My Life**, *which will add foster kids to the diverse group of students EXITO will serve. When you put all these things together, you realize it just might be possible to win a grant like this at PSU even with the resource limitations we face. You're not going to hit a home run every time, but it is possible.*

TK: *I'd add that I think the support we've had from RSP has been quite helpful. RSP's Research Advisory Council has brought researchers together. It's a great network to have when an opportunity like this comes along. Access to RSP staff like [Assistant VP] Alan [Kolibaba] has also been helpful. I came from University of Washington and University of Chicago and at those universities the research office was... way over there. Places where you sent things and hoped to get them back. I think access to key administrators is really crucial.*

EXITO Takeaways

- Build upon knowledge and skills gained from previous projects.
- Leverage the strengths of PSU including existing programs, networks, and partnerships.
- Bring a diverse group of collaborators to the table.
- Harness the resources of PSU's professional staff.

KL: *I would say the same of Sponsored Projects Administration* **[SPA]**. *The staff was integral to keeping us on target throughout the proposal process. I've been on a number of large grants where we've gone in as the prime because other larger institutions couldn't respond as quickly. We can do that here. I can't count the number of times SPA staff worked through the night for us to get stuff finished for the next day. They've helped make us very competitive.*

TK: *Little things like that were turning points for us. The SPA staff really helped us see all the pieces and how they had to come together. And in the end, they all did.*

Deciphering Biology's Go-To Molecules in the CLSB

By Shaun McGillis

In nature, proteins are biology's workhorses. Made of chains of amino acids, these large molecules have many functions. They make it possible for our bodies to convert nutrients, water, and oxygen into life-supporting energy. They help DNA replicate and transmit genetic information. As antibodies, they protect our cells from bacteria and viruses. And they help cells communicate vital information with one another, an evolutionary innovation essential to keeping organisms healthy.

Although proteins have been a hot topic of life science research since the mid-19th century, recent technological advances have revolutionized the way scientists study them. Many of these new methods are now available to PSU and **Oregon Health and Sciences University** (OHSU) researchers working in the **Collaborative Life Sciences Building** (CLSB). The CLSB's stunning facilities are helping both universities attract a new cadre of bioscience research leaders.

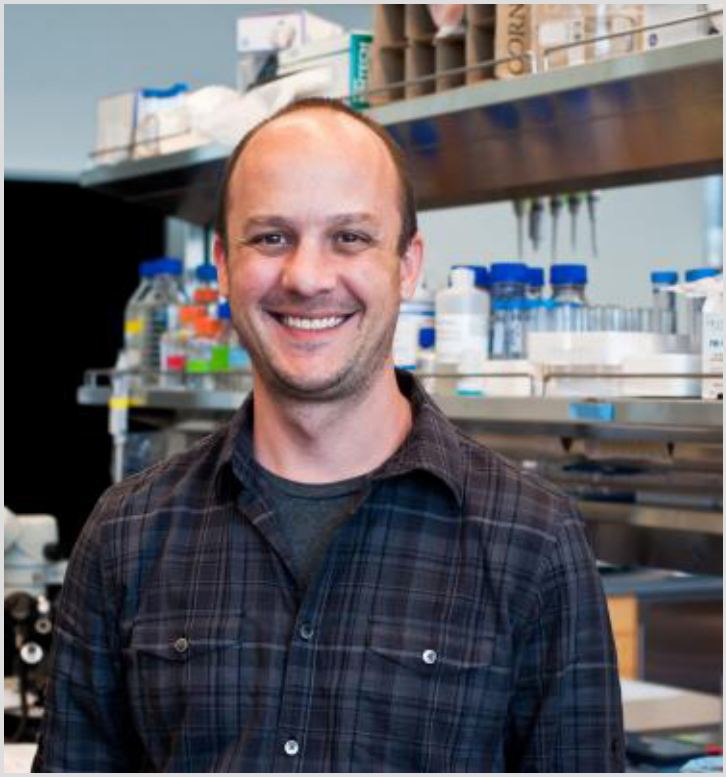
Assistant Professor of Chemistry **Steve Reichow** is one of the first of this new breed, coming to PSU from the prestigious Howard Hughes Medical Institute. His structural biology laboratory, located near research groups from OHSU and Oregon State University, is designed to look at how proteins in membrane walls control the flow of water, nutrients, and information into and out of cells.

Dr. Reichow's group uses electron microscopes in the FEI Living Lab, a state of the art facility set up through collaboration between OHSU and Hillsboro-based FEI, Inc. These instruments let Reichow's team characterize proteins' chemical compositions, determine their molecular architecture and examine the relationships between the intricate structures that give them their distinct shapes and the functions they perform.

Membrane proteins are cell gatekeepers, opening and closing channels through which specific molecules enter the cell interior. They also permit inter-cellular communication. For example, if a certain part of the body lacks nutrients, water, or oxygen, that information can be relayed to other cells through channels controlled by membrane proteins, directing resources to where they are needed.

Medical science is interested in these proteins because they may control paths through which small-molecule drugs could pass in the targeted treatment of cellular diseases. Dr. Reichow is trying to decipher the hidden structures and genetic information responsible for the special properties of membrane proteins.

According to Dr. Reichow, the work done in his lab is analogous to what archaeologists do in the field. "Sometimes you find something and you're not sure what it is," he said. "But you might be able to infer its function based on its appearance and composition.

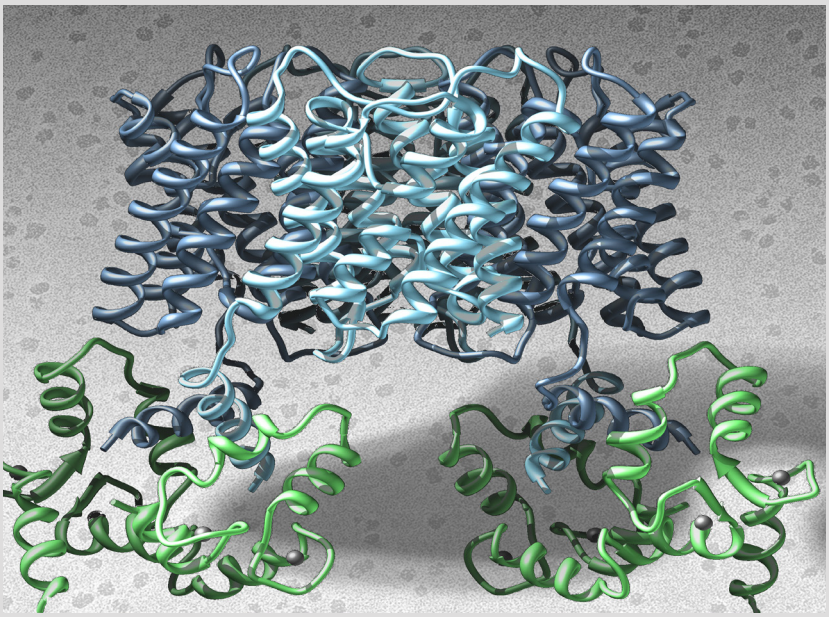


Dr. Steve Reichow

"An archaeologist might find a bowl-shaped object and hypothesize that it was used to hold something. We do much the same with proteins, but unlike the archaeologist, we can use tools available to us to design experiments to test our hypotheses."

The specialized tools Reichow relies on most are cryo-electron microscopes (cryoEM). Because the wavelengths of electron beams are so small, electron microscopes can achieve magnifications many thousands of times greater than standard light microscopes. These machines provide superb atomic-scale images of non-biological materials such as inorganic crystals and metals. This hasn't been the case for biological samples, which are sensitive to the high levels of radiation inside electron microscopes. Until recently, structural biologists like Dr. Reichow could only study the fine three-dimensional structure of proteins using X-ray crystallography, in which biological samples are crystallized and imaged using an X-ray beam. This method of imaging, like standard electron microscopy, can be highly damaging to biological materials. In contrast, the cryoEMs in the FEI Living Lab freeze samples containing proteins at extremely low temperatures, preserving the delicate structures that can reveal how cells function.

Continued on the following page.



Top Image: (Background) An image of individual membrane protein complexes (dark shapes) recorded on an electron microscope. (Foreground) The resulting three-dimensional atomic model of the Aquaporin protein complex based on these images. Middle Image: FEI Helios Nanolab 650 Dualbeam Microscope with cryoEM capability available to researchers at the CLSB. Bottom Image: The Collaborative Life Sciences Building on the South Waterfront.

Dr. Reichow uses cryoEM and other methods to study a particular class of proteins called Aquaporins, which specialize in letting water into cells, while excluding other substances such as solutes or ions. One of the aims of the Reichow Lab is to understand how cells regulate the flow of water to meet our bodies' physiological needs. Another is to understand how cells communicate through pathways controlled by membrane proteins, a function essential to a number of physiological activities including synchronizing of heart muscle contractions, coordination of brain activity, and sharing of metabolic information.

"Cellular micro-structures play a very important role in the function of how molecules in our body work," Reichow said. "The reason I'm so excited to be at PSU is that the FEI Lab is going to allow us to collect better data on these membrane proteins. That is a game changer for us.

"We're going to be able to construct three-dimensional models and see more detail than ever before. We'll be able to look at these structures at the genetic level. Then back in the lab we can design experiments to see how the function of a protein changes when we alter its form.

"Conversely, if a patient shows up with a disease and we can track that disease to a mutation in a specific protein, then pharmaceutical companies may be able to develop drugs based on the protein's unique structure that target affected cells with those mutant proteins."

The promise of the CLSB is to bring new techniques together with new scientists and new partnerships to push back life science's frontiers of life sciences. Dr. Steve Reichow's work on membrane proteins is giving us one of our first glimpses of this exciting potential.

Dispatches from Rwanda

By Jonathan Fink

Continued on the following page.

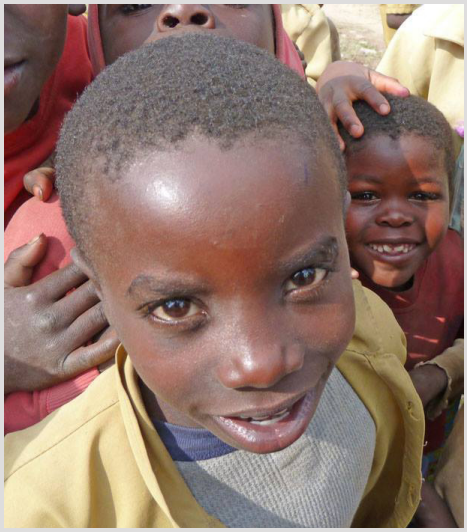
Rwandan family learning how to use their new water filter.

For the Fall 2014 term, PSU Mechanical Engineering Professor Evan Thomas is in the tiny, east African nation of Rwanda working on an ambitious program, locally called Tubeho Neza ("Live well"), to help reduce childhood mortality from diarrhea and pneumonia by distributing water filters and clean-burning cook stoves to the poorest quarter of this UN designated Least Developed Country (LDC). The project is run by DelAgua Health, of which Evan is the Chief Operating Officer, in partnership with the Rwandan Ministry of Health (**http://www.delagua.org/projects/rwanda**). This report is based on a recent visit I made to Evan's inspiring operation.

Much of the funding for the project comes from the sale of United Nations issued carbon credits, made possible because the filters and stoves reduce the villagers' need for firewood, thus lessening the pressure on Rwanda's mostly-depleted forests. Receiving carbon credit funding requires careful monitoring of the use of the stoves and filters, which is done by independent auditing organizations, as well as through a robust research program run out of PSU in collaboration with the Oregon Health and Science University (OHSU), the London School of Hygiene and Tropical Medicine, Emory University, the University of Colorado at Boulder, the University of California at Berkeley, and the University of Rwanda.

Tracking the performance and usage of stoves and filters is accomplished in part through the use of wireless transmitters that Evan and his co-workers at PSU have developed, which are embedded in approximately 1% of the deployed filters and stoves. The transmitters send usage data over the ubiquitous cell-phone network to the research and programmatic teams. These sensors are also deployed in 14 other countries by PSU, and allow philanthropic, public and private funders of public health programs to know whether their investments are being used and having impact.

I observed the deployment that was part of the second of Tubeho Neza's three phases. Phase I, which was completed in 2012, reached 10,000 people in 15 villages. Phase II, which began in September 2014 and is scheduled to be completed by the end of 2014, should reach 500,000 people in 2600 villages. Phase III in 2015 aims to serve at least 2M people in 13,000 villages. DelAgua, which is a social enterprise, hopes that the less poor 3/4 of the population, seeing the health benefits received by their neighbors, will choose to purchase stoves and filters for themselves, helping the company recover their costs and allowing them to continue to receive payments for carbon credits.



Tubeho Neza seeks to reduce childhood mortality.

Each deployment is a complex, well-choreographed operation. Filters and stoves are picked up at DelAgua's warehouses in Kigali and delivered to the villages by the Rwandan National Police, contingent on the roads being passable, which is not always the case, especially during the two annual rainy seasons. Coordination is done ahead of time with the village leaders, who confirm the identities of each community member that will be receiving filters and stoves. Local Community Health Workers (CHW), who are employees of the national government and get trained by DelAgua staff, assist with the distribution.

The actual deployment kicks off with speeches by a village leader and a DelAgua project manager, who outline what will be taking place over the following few hours. Next, the CHWs put on a humorous play, depicting the health effects of contaminated drinking water and dirty indoor air from cooking. This is followed by more speeches telling the villagers about how the filters and pumps work, and the nature of the program, including warnings to not steal or try to sell the devices. Each recipient then gets checked off a list by a village leader, gets their stove and filter, along with a poster that shows how they're used, and heads back to their home. CHWs then go to every home to explain again how the devices work, using a picture book as well as the poster. They also conduct a survey about the family, which provides baseline information about demographics and helps in calculating carbon credits. GPS locations and photos of the homes are recorded, along with bar codes for the filters and stoves.

Before the end of the day, after the families have had an opportunity to try their devices, the CHWs return to make sure everything is working properly. All of these activities are designed to be robust implementations of well-established health behavior change methodology.

The community members I met seemed grateful and intrigued by the whole process. The scale is ramping up rapidly, but the underlying public private partnership model for aid distribution is not yet well established. Success requires the cooperation of the community, the National Police, the Ministry of Public Health, the CHWs, DelAgua's leadership, the manufacturers of the stoves and filters, the organizations providing the carbon credits, and the weather. I found the ambition and scale of the program to be mind-boggling. If they succeed, it could radically change the way global assistance is done.

As if the humanitarian aspects of Tubeho Neza were not impactful enough, DelAgua's work in Rwanda is also the subject of a major scientific research program encompassing mechanical and electrical engineering, tropical medicine, epidemiology, statistics, and climate change. The PSU-led team of researchers described above are participating in a large-scale randomized controlled trial (RCT) to evaluate the health impacts of the filter and stove deployments. DelAgua

Evan Thomas replacing a wireless transmitter in a water pump, as young users look on.

DelAgua staff programming wireless transmitters in PSU's "Kigali Lab."

is the primary funder of this research effort, with some additional support from the United States Agency for International Development (USAID). Nearly $2M of funding has come through PSU for this program over the past two years.

Comparison with 40,000 households in the control areas is used to help evaluate the 100,000 households in the program areas. The team is measuring villagers' behavior and device use through a combination of the PSU sensors, self-reported health conditions, blood samples, blood pressure, and in situ air and water quality monitoring. This information is then compared with clinically reported pneumonia and diarrhea cases among children under 5. This is one of the largest environmental health RCTs ever run.

In addition to the DelAgua program, PSU leads a separate research project, funded by the British Department for International Development, to put sensors on 200 hand pumps across Rwanda to assess the relative efficacy of three different operation and maintenance models with the goal of seeing if sensors can improve the cost-effectiveness of water service delivery in developing countries (**http://www.pdx.edu/sweetlab/cellpump**). This is a critical issue because worldwide, roughly half of the water pumps installed by governments and aid programs are broken at any given time, and estimates of compliance with international metrics such as the Millennium Development Goals are likely over estimating progress.

These projects are expected to result in a large number of scientific publications in the next few years, and will open the door to many additional funding opportunities for comparable programs in several other developing world settings. In addition to the social and economic benefits in the targeted countries, this work can demonstrate the beneficial role of cutting-edge engineering technology in international development, expand the market for carbon credits, extend the global reach of Oregon companies and institutions, form part of the foundation for the new joint OHSU-PSU School of Public Health, and provide unique training opportunities for students from the US, UK, Rwanda, and other LDCs.

The 2014 Clean Tech Challenge

By Shaun McGillis

"Clean tech" covers a broad spectrum of growing industries. From smartphone apps, to innovative uses of waste materials, to environmentally friendly batteries that run electric vehicles, clean tech is an essential component to improving quality of life and growing the economy in a responsible and sustainable way.

To support clean tech projects of PSU-affiliated inventors and entrepreneurs, the university partnered with Wells Fargo to hold an annual competition: the Clean Tech Challenge. This year Wells Fargo donated $100,000 to the competition.

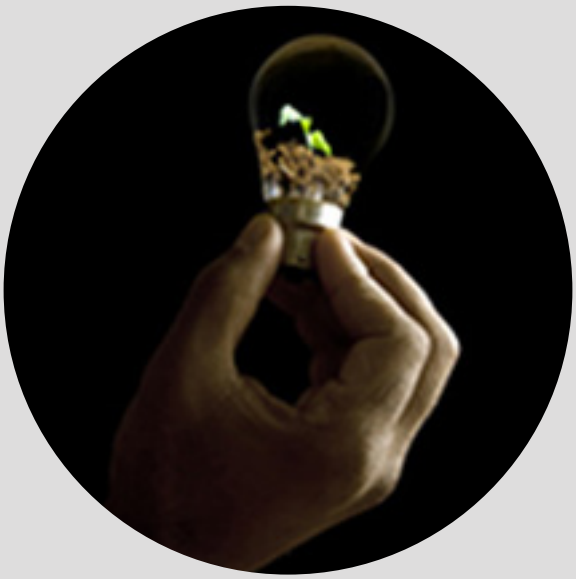
With $2,500 development grants, seven teams set out in May to create prototypes of their technologies. In mid-September the teams gathered at **Oregon BESTFest** to pitch their ideas to a panel of judges. Judges awarded the grand prize of $10,000 to a team that developed an alternative car battery. The second-place prize went to a device that uses sensor technology and a smartphone app to measure cyclists' exposure to air pollution in real time. Learn more about this year's competitors in the sketches below.

Thor Volt: Clean Tech Challenge grand prize co-winners Andrew and Jonathan Thorsvik developed an alternative electric power source for automotive vehicles that eliminates most environmental and health risks, has triple the life expectancy, and recharges many times faster than traditional lead-acid automotive batteries. Andrew Thorsvik is a graduate student in the Department of Engineering and Technology Management and an Operations Manager at Intel. **READ MORE**

New Building Materials: Clean Tech Challenge semifinalists Assistant Professor of Architecture Margarette Leite and her students Trevor Stevens, Reid Weber and Kevin Chavez believe building materials like insulation made from repurposed waxed cardboard could provide retail organizations around the country an ecofriendly solution to a costly waste problem. **READ MORE**

Monitoring Bicyclists' Exposure to Air Pollutants: Clean Tech Challenge runner-up Alex Bigazzi, a Ph.D. student in the Department of Civil and Environmental Engineering wants to introduce cyclists to a tool that will allow them to monitor their exposure to harmful air pollutants while riding. Called SPEC (Sensing Pollution Exposure by Community), Bigazzi's bike-mounted device is a networked multi-sensor machine that records levels of certain air pollutants, meteorological data, location and duration of trips, and physiological information (heart and respiratory rates). It then uses a smartphone app to analyze, manage, and store the aggregated data. **READ MORE**

Redesigning the Stirling Engine: Semifinalist Asif Rahman, adjunct professor of computer engineering, envisions a simple generator powered by the sun's heat and photovoltaic energy that could bring electricity to developing countries around the world. His Stirling-type-engine design would meet the energy needs of a single family and would be easy to maintain and repair with materials readily at hand. Users would be able to install and use the engine in off-grid locations to power a variety of devices from water pumps, to electric cook stoves and other machines.



Smart Shades: "Smart Shades" will use solar-powered sensors to monitor the temperature outside of house and open and close the shades as the outdoor temperature increases and decreases throughout the day. The team also plans to develop an app to connect the shades to "smart" home HVAC (heating, ventilation, and air conditioning) systems. Team members Craig Lardiere, Matt Meeks, Sam Mohler, and Matt Martinez are all undergraduate mechanical engineering students. **READ MORE**

The Portland Shower: A team of seven PSU students want to change the way we conserve water and energy in our homes. The "Portland Shower" is an open loop system that captures, treats, reheats, and cycles back the water raining out of a shower head. Team members Nathan Nguyen, Owen Killingsworth, and David Dang are undergraduate engineering students. Team member Sarah Shannon is an MBA student. **READ MORE**

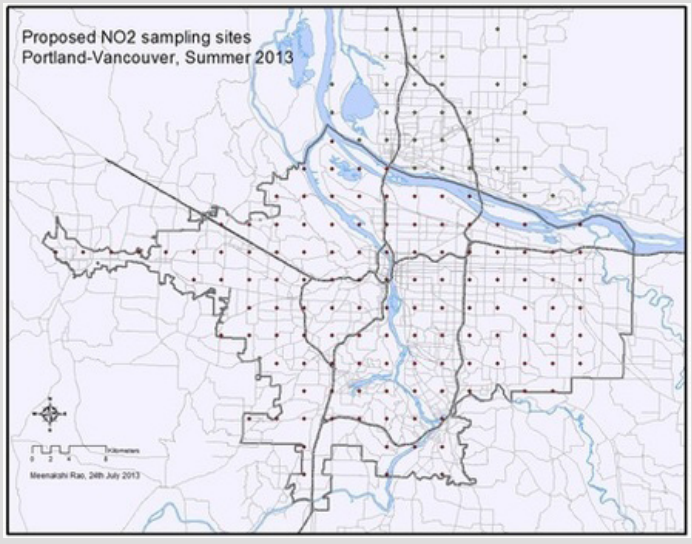
Improving Energy Transmission: A Team of Clean Tech Challenge semifinalists want to use inexpensive microcontrollers and transistor switches to increase the efficiency and lower the cost of solar cells by using AC voltage. Team member Benjamin Hendrickson is a graduate student in applied physics, Morley Blouke is a researcher and graduate advisor in the PSU Imaging Group, and Josh Olsen is an undergraduate physics student. **READ MORE**

PSU Researchers Pinpoint Links Between Trees and Air Quality*

An interdisciplinary team of scientists from Portland State University has found direct links between the presence of mature trees in a city and the air quality its citizens enjoy, uncovering new pathways to understanding the value provided by urban forests and the design of healthy cities.

The PSU **Trees and Health team** worked with numerous community volunteers, including many PSU and Washington State students, to place a web of 144 sensors across the greater Portland region. The scientists then examined neighborhood-specific air quality data correlated with detailed maps of Portland's tree canopy, creating a new way to project and compare what it's like to breathe in different corners of the city.

The researchers then went a step further, calculating the total health-related respiratory benefit from Portland's urban forest. The amount of nitrogen dioxide—an air pollutant that contributes to respiratory illnesses such as asthma—removed by the region's trees amounts to about $7M per year saved by avoiding missed school and work days, emergency room visits, and hospitalizations.



The results of the study, published in the academic journal *Environmental Pollution*, is the first to take the study of air pollution effects to the neighborhood level and to quantify the regional ecosystem services provided by urban trees.

"This information will help us inform the discussion about how cities are built and how it matters to the people who live there," said Vivek Shandas, associate professor in PSU's Toulan School of Urban Studies and Planning and a leader of the "Healthy Trees, Healthy People" research project. "It also highlights potential environmental justice issues, as a majority of the most mature trees—the most valuable for reducing air pollution—are located in wealthy neighborhoods."

This initial base of information will be used for further study by public health and environmental science researchs. The team would like to see the study replicated across the country in order to help city leaders make informed decisions about city planning. While the easy answer to better air quality would seem to be "plant more trees," some types of trees can create air quality problems through their own emissions of gases and pollen. The Trees and Health team scientists are drilling down into what types of trees are most beneficial in different urban settings.

The interdisciplinary Trees and Health team includes Shandas; Linda George, professor of environmental science; Todd Rosenstiel, associate professor of biology; Alexis Dinno, assistant professor of community health; and Meenakshi Rao a School of the Environment Ph.D. candidate.

*Source: Christina Williams, Institute for Sustainable Solutions

ORcycle

Adding to the growing portfolio of transportation-related smartphone apps that includes Alex Bigazzi's SPEC app, **The Transportation, Technology & People Lab** (TTP) at PSU has developed a smartphone app to collect route, infrastructure, and safety data for the Oregon Department of Transportation (ODOT). With **ORcycle**, riders can record bicycle trips, display maps of rides, and provide important information on topics including route safety, crashes and bicycle infrastructure. With this data transportation planners can improve services to Oregon's bicycling community. Data recorded using the ORcycle app will be available to the general public in early 2015.

The ORcycle pilot app is available for download at: **http://www.pdx.edu/transportation-lab/orcycle**

OTREC is now TREC, the Transportation Center for PSU*

Portland State University has earned a reputation for innovative transportation programs that span multiple disciplines, all in service of livable communities. That expertise is now available in a single place through the newly renamed TREC, Portland State's Transportation Research and Education Center.

Growing out of OTREC, TREC is the steward of Portland State's participation in the U.S. Department of Transportation's (DOT) **University Transportation Centers** program. DOT has awarded Portland State more than $30 million since 2006, with a non-federal match requirement amplifying the effect of the federal investment and touching more community partners.

The new website, **trec.pdx.edu**, lets visitors search for transportation research and researchers across campus by topic or browse by research area.

With leadership from Rep. Peter DeFazio, OTREC was founded in 2006 as a four-campus consortium and expanded into a broader transportation center. The original OTREC grant ran until 2014, funding 237 research, education and technology transfer projects. In addition to carrying on this legacy, TREC also:

- Builds on the Center for Transportation Studies, established in 1966. The longstanding **Friday Transportation Seminar Series** that began with this center continues under TREC.
- Incorporates the **Initiative for Bicycle and Pedestrian Innovation**, IBPI, created in 2007. IBPI offers a full range of professional development activities focused on walking and bicycling.
- Houses **Portal**, a multimodal transportation data archive that makes data accessible to researchers and practitioners to make our entire transportation system better understood and more efficient.
- Administers the **National Institute for Transportation and Communities**, or NITC, program, the U.S. DOT's national center for livable communities.

TREC uses Portland as a "living laboratory," focusing on the role of transportation in fostering vibrant communities. It seeks to improve the safety and efficiency of walking, cycling and transit, while using data, analytical tools and emerging technologies to help decision-makers better serve all users. It looks deeply at how our transportation system affects land use, the environment, health and quality of life.

"We're proud of the contributions from the Maseeh College of Engineering and Computer Science, the College of Urban and Public Affairs and all the transportation innovation across the Portland State University campus," said TREC Director Jennifer Dill, a professor in the Toulan School of Urban Studies and Planning. "We're pleased to move forward as TREC to address the challenges for the future of transportation together."

***Source: TREC News**

*Taming Manhattan: Environmental Battles in the Antebellum City**

Urban agriculture has come full circle over the past two hundred years, says author and environmental historian Catherine McNeur.

Backyard chickens, rooftop beehives, and urban-grazing goats scattered across modern neighborhoods in Portland and beyond are often considered to be important elements of sustainable, livable cities. But in budding nineteenth century U.S. cities, tending urban livestock and home gardens was seen as filthy and dishonorable, and municipal governments began writing laws to push agriculture from their cities' cores.

"These are the laws urban homesteaders in New York, Portland, and cities across the country are fighting to reverse today," McNeur said. "Nowadays with heritage chickens and the embrace of a DIY lifestyle, urban agriculture tends to be fashionable and attractive to a range of people, rich and poor—this was hardly the case in the nineteenth century."

McNeur is an assistant professor of environmental and public history at Portland State University, and her new book, ***Taming Manhattan: Environmental Battles in the Antebellum City***, published by Harvard University Press, hit the shelves this October.

While based in Manhattan, the stories of urban transformation—and its consequences for communities past and present—are similar for many cities across the U.S.

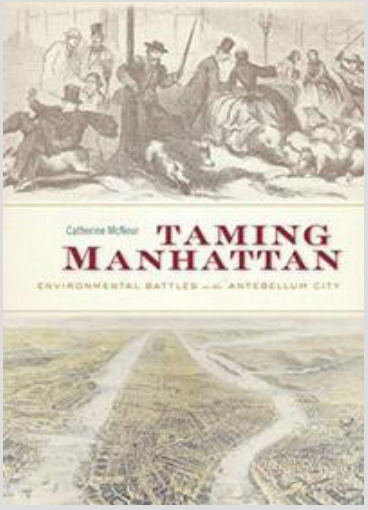
"It was the fastest-growing city in the pre-Civil War era. A lot of issues that Manhattan faced, many cities faced later," McNeur said.

Beyond the battles over backyard chickens and pigs, McNeur's book unearths historical struggles around environmental justice and power structures that parallel the ones we face today, including: political battles over food regulation and access to safe, healthy food; disputes over which parts of town parks and green spaces are built and municipal debates about marginalized communities, such as shantytowns

"Ideas of what properly belongs in a city have changed over time," she said. "This book is about the growth of shantytowns, the embrace of public parks, and the death of urban agriculture. Nineteenth-century urbanites had a completely different idea of what made a city 'sustainable.'"

This spring, McNeur will be teaching a global environmental history course at PSU titled Environment & History, and another course focusing on Portland's heritage trees.

Catherine McNeur, Assistant Professor, Department of History



Taming Manhattan: Environmental Battles in the Antebellum City (Harvard University Press, 2014)

*Source: Laura Gleim, Institute for Sustainable Solutions

Protecting Your Personal Data

The transfer and storage of digital data is ubiquitous today. The safety and protection of data is not. But recent advances in cryptography are providing IT companies with better safeguards against data breaches.

By Shaun McGillis

PSU cryptologist Thomas Shrimpton, Associate Professor, Department of Computer Science and his graduate student, Seth Terashima, developed a tweakable cipher encryption technology useful to organizations that store and encrypt massive amounts of data. This patent-pending innovation was licensed to Voltage Security, a leading expert in data-centered encryption.

Shrimpton also received a gift of $100K from Google Executive Chairman Eric Schmidt for his related work "Format-transforming encryption" with student Kevin Dyer, and collaborators from other institutions.

Tom Shrimpton, Associate Professor, Department of Computer Science

My Life

By Shaun McGillis

Making the transition into adulthood can be tough for young people in foster care. For many, the changes are abrupt, occurring on their eighteenth birthday when they "age out" and are no longer considered wards of the state.

Research conducted at PSU and elsewhere has shown that unlike their peers who are raised by their parents, these young people are far less likely to possess the skills and resources to successfully manage the challenges they'll encounter during this pivotal time.

"My Life" is a yearlong, youth-driven, coaching and mentoring program for foster children as they become adults. The program was developed and evaluated over a decade by PSU Professors Sarah Geenen and Laurie Powers of the **Regional Research Institute** (RRI) in the **School of Social Work** (SSW), in partnership with Portland Public Schools and the Oregon Department of Human Services (DHS). It is supported by grants from the U.S. Department of Education and the National Institutes of Health.

In the program, young people learn to apply self-determination skills that help them successfully pass from being teens to grownups. Over the course of a year, they receive one-on-one support from a certified coach and work with learning materials designed to help them overcome barriers to success. The youths practice achievement, partnership, and self-regulation skills in real-world settings. Coaches provide learning opportunities and are present as the young people take the lead on activities such as job searches, college visits, identifying resources, and developing relationships.

In addition to weekly youth/coach interactions, participants also sit in on four to six mentoring workshops. These are designed to be youth-directed and fun, while also addressing topics related to becoming adults. These events are moderated by mentors with similar life experiences as participants—young adults (including My Life program coaches and alumni) that have successfully transitioned from foster care into adulthood.

Over the last decade numerous My Life program experimental studies and publications have documented the positive effects of enhancing these self-determination skills: increased high school graduation rates, employment, college participation, and

improved quality of life and mental health.

RSP's **Innovation & Intellectual Property** (IIP) office recently assisted Dr. Powers and the My Life program in establishing a series of new partnerships that will see the implementation of the program by three organizations dedicated to improving life outcomes for young people.

With funding from DHS, Portland's **New Avenues for Youth** has hired two veteran coaches from the My Life study team and will be assisted by of two SSW students in order to support 20 youths in the first My Life satellite program in the coming year.

In a second satellite program, **Albertina Kerr Center** is partnering with PSU to support the needs of youth with developmental disabilities and mental health challenges and help them reach their full potential.

Portland-based **Friends of the Children** (FOTC) is also collaborating with the university. FOTC serves nearly 1,000 youths in seven cities in the U.S. and the U.K. My Life program staff is working with FOTC to develop a customized international mentoring

model, which aligns with key principles and approaches from My Life but is tailored to FOTC's own youth mentoring program.

These partnerships will not only expand the population of youth the My Life program serves, they will also lay the groundwork for future partnerships, provide additional data on the outcomes of the program with various populations, integrate the My Life program with Independent Living Program services, and help hundreds of at-risk foster youth meet the challenges of becoming adults.

"The great thing about this program," said Powers, "is that it is all youth driven. My Life fits within the context of their dreams, goals, and experiences of what they have to deal with. We want these young people to feel supported, to succeed, and to be able to point to something they accomplished and say to themselves, 'I was responsible for achieving that.'"

Reclaiming Futures Receives $2 Million to Pilot Innovative Youth Intervention Program

PSU is widely recognized for the diverse research and service it does to help at-risk populations. One of the flagship programs in this portfolio is **Reclaiming Futures**, an initiative founded by the **Robert Wood Johnson Foundation** in 2000 and headquartered in the **Regional Research Institute** (RRI) at PSU. Reclaiming Futures uses integrated, community-based substance abuse and mental health interventions to help justice-involved youth get their lives back on track.

39 communities in 18 states have implemented the Reclaiming Futures models, helping thousands of vulnerable and at-risk youths receive the treatment they need and the continued support of caring communities that are critical to their success after exiting the juvenile justice system.

Building on this nationwide experience, Reclaiming Futures recently received a grant of $2M from the **Conrad N. Hilton Foundation** to pilot an innovative comparative program based in five sites (three existing and two new). One hundred young people from each site will participate in this first of its kind adoption of a Screening, Brief Intervention, and Referral to Treatment (SBIRT) program for youth in juvenile justice settings.

According to Jim Carlton, Deputy Director of Reclaiming Futures, SBIRT is a method many adults may have been exposed to without realizing it. Doctors and health care practitioners frequently use SBIRT to identify individuals with substance abuse problems and refer them to treatment. If a doctor has ever asked you during an appointment about your alcohol consumption (how much you drink and how often), then you've experienced at least a portion of a SBIRT intervention.

"Interventions like this are common in adult populations," said Susan Richardson, National Executive Director of Reclaiming Futures, "but they haven't been attempted in the juvenile justice setting. We want to see youth at risk of developing substance abuse problems getting the right treatment, at the right time and in the right place. Reaching more low to moderate risk youth earlier is why we're developing and piloting the SBIRT program."

While the Reclaiming Futures model serves at-risk youths who have entered the court system, the SBIRT pilot is an "up stream" program with the aim of reaching those with potential substance abuse problems before they become fully engaged in the system.

At the core of the pilot program will be an intervention developed by Evan Elkin, a trained psychologist, researcher, Advising Consultant for Reclaiming Futures, and an expert in developing, implementing, and assessing innovative programs in the fields of public health, addiction, and education.

"It's about meeting the youth where they are," Carlton said, describing Elkin's approach. "The idea is to get a dialogue going and build a relationship to help them figure out where in their lives substance abuse might be affecting them in a negative way and then to naturally come to a place in their own mind where they're thinking about taking a different path."

Hilton Foundation support will allow Reclaiming Futures to design, implement, and evaluate this innovative approach to SBIRT at three existing and two new sites. This new funding offers the opportunity for Reclaiming Futures to expand its influence to vulnerable juvenile populations around the country that have not yet gone down the path to delinquency and crime. This is another demonstration of the extensive reach of applied social science research developed at PSU.

By Shaun McGillis

PSU and Multnomah County Library Launch $500K Study Focused on Bridging the Digital Divide*

Read the original story in the *Oregonian*

The Multnomah County Library is teaming up with Portland State University to tackle the "digital divide" between low-income people and their wealthier counterparts nationwide.

Library leaders announced plans this week to launch an extensive study of low-income library users' technology habits and needs. They'll share the results of that study with colleagues across the nation, in hopes of sparking widespread improvements in the way libraries cater to patrons with limited technology access.

"A lack of basic computer and Internet skills, or even a lack of comfort with those tools or access to those tools, can make it really hard to search for jobs, to access health information, to get in touch with family and friends," said Amy Honisett, a Multnomah County librarian working on the study.

Researchers hope that by learning more about the technological shortcomings of their lowest-income patrons, they'll be able to offer new library services to fill the gap.

The project is funded by a $500,000 grant from the Institute of Museum and Library Services. Multnomah County is one of 51 agencies across the nation to win the institute's prestigious National Leadership Grant this year.

Over the course of the two-year project, researchers from the library and from PSU's Literacy, Language & Technology Research Group will survey more than 700 adults who use the Multnomah County Library.

They'll reach average library users as well as those who don't speak fluent English and senior citizens with limited technology skills, said Jill Castek, a PSU assistant professor assigned to the grant.

Although technology use nationwide has been steadily rising for decades, experts estimate some 15 percent of Americans still lack Internet access. Low-income people were most likely to lack access.

With those stats in mind, the Multnomah County team will focus their study on library locations in low-income areas, with an eye on how patrons there interact with technology, where their skills fall short, and how the library can help.

"Once we learn where the deficits lie, the library will use the data we gather to better design their programs to meet those needs," Castek said.

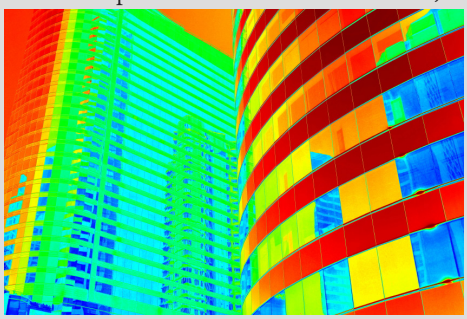
*Source: Kelly House, *The Oregonian*

NSF Awards $631K to Launch Interdisciplinary Program for Engineering and Architecture Students

The building sector accounts for forty-one percent of energy consumed in the U.S., far outpacing transportation and industrial energy needs. Over a third of that energy is produced by coal burning power plants, which emitted nearly two billion tons of CO_2 into the atmosphere in 2011 alone.

A new collaborative, interdisciplinary program at PSU will prepare at least 180 engineering and architecture students to answer the challenges of reducing energy consumption in the building sector. The program is led by Assistant Professor Cory Griffin of the **School of Architecture** and colleagues from the **Maseeh College of Engineering & Computer Science**.

The Interdisciplinary, Research-based Engineering and Design (IRED) Green Building Scholars project will recruit underrepresented minorities into the building sciences, improve students' research capabilities in interdisciplinary building sciences courses that take place in the lab and in the field,



and offer scholarships to incentivize students to pursue graduate studies in engineering and architecture.

The project also aims to improve services for students and catalyze an interdisciplinary certificate or degree in building science to continue the program into the future. And if successful, the IRED could serve as a model for promoting diversity and interdisciplinary collaboration for other STEM fields.

Cutting the ties between the building sector, energy consumption and the emission of greenhouse gases will require rethinking how buildings are designed, built, retrofitted and remodeled. IRED will provide a diverse cohort of PSU students the experience and research skills they'll need to enter the building sciences and work with colleagues across fields to radically reduce the energy use and environmental impact of the buildings we inhabit.

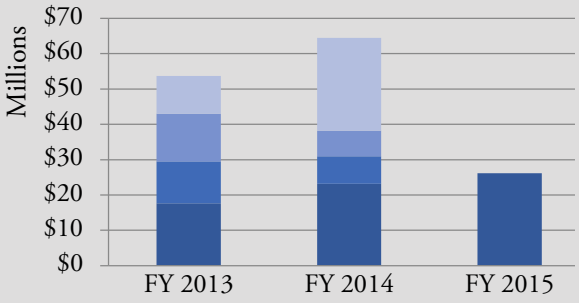
By Shaun McGillis

Research Snapshot

First Quarter, Fiscal Year 2015

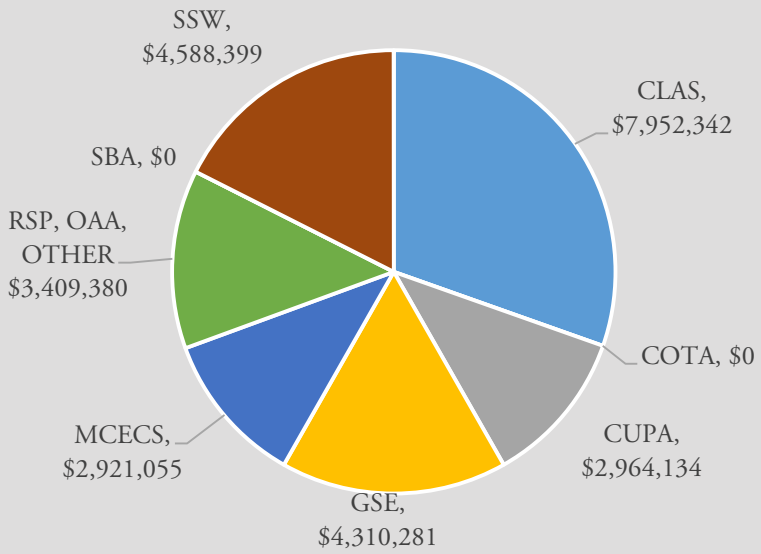
Awards Received Q1, 2015

Awards by Quarter



	FY 2013	FY 2014	FY 2015
Q4	$10,671,222	$26,262,166	
Q3	$13,504,425	$7,285,660	
Q2	$11,895,294	$7,751,427	
Q1	$17,639,091	$23,177,101	$26,145,591

Amount of Awards Received



Selected Awards

View the Complete List of Awards
http://www.pdx.edu/research/awards-fy15-q1

Andrews, Sona, Jhaj, Sukhwant, Van Der Schaff, Hans, *reThink PSU*, **OAA**, $225,000, Association of Public and Land-Grant Universities, **New**

Bank, Lewis, Oschwald, Mary, Powers, Laurie, *Internet Safer and Stronger Program for Men with Disabilities (Men's SSP)*, **SSW**, $200,000, US Department of Education, **Amendment**

Barsanti, Kelley, *Synthesis of Comprehensive Emissions Measurements and Multi-scale Modeling for Understanding Secondary Organic Aerosol Chemistry in Wildland Smoke Plumes*, MCECS, $435,313, Bureau of Land Management, **New**

Brown, Kim, *Effects of Environmental Estrogen Exposure on Spontaneous Copy Number Variation*, CLAS, $241,982, National Institutes of Health, **Amendment**

Carder, Paula, Neal, Margaret, White, Diana, *Oregon Nursing Facilities Report*, **CUPA**, $450,000, Oregon Department of Human Services, **New**

Crum, Eric, *PSU FY15 EE Grant*, **CUPA**, $204,085, Environmental Protection Agency, **New**

Cruzan, Mitchell, *Collaborative Research: Controls over Prairie Plant Range Distributions under Future Climate Change*, **CLAS**, $1,061,925.00, National Science Foundation, **New**

Cummings, Michael, *STEM Professional Development in Rural Eastern Oregon*, **CLAS**, $129,000, Western Oregon University, **New**

Deardorff, Pam, *Professional Development Systems, Standards, Support*, **GSE**, $3,113,012, Oregon Department of Education, **Amendment**

DelaVega, Esperanza, *Exploring Culturally Responsive Pedagogy and Practice in the Intersections of Closing the Achievement Gap and Equity Work in Portland Public Schools*, **GSE**, $128,094, Oregon Department of Education, **New**

Deur, Douglas, *A Telaquana Trail Cultural Landscape Report within Lake Clark National Park and Preserve*, **CLAS**, $176,000, National Park Service, **New**

Dill, Jennifer, *Status and Needs for Public Transportation in Oregon*, **CUPA**, $180,865, Oregon Department of Transportation, **New**

Eppley, Sarah, Rosenstiel, Todd, *The Functional Role of Moss in Structuring Biotic Interactions, and Terrestrialization of Antarctica*, **CLAS**, $498,561, National Science Foundation, **New**

Figliozzi, Miguel, *Safety Effectiveness of Pedestrian Crossing Enhancements*, **MCECS**, $130,000, Oregon Department of Transportation, **New**

Research Snapshot

Selected Awards, Continued

Freels, Sandra, *Russian Flagship Center*, **CLAS**, $338,606, Institute of International Education, **Amendment**
Gamburd, Michele, *Chinook Cultural Assessment and Monitoring*, **CLAS**, $20,000, Washington Department of Fish and Wildlife, **New**
George, Linda, *Consulting: Calibration of NO2 and CO Sensors*, **CLAS**, $56,275, Intel Corporation, **New**
Green, Beth, *Testing the Efficacy of Early Head Start in Preventing Child Maltreatment: A Fifteen Year Longitudinal Study*, **SSW**, $350,000, Centers for Disease Control and Prevention, **Amendment**
Hammer, Leslie, *Development and Evaluation of Veteran Supportive Supervisor Training (VSST): Improving Reintegration of the Oregon National Guard and Reserves in the Workplace*, **CLAS**, $334,894, US Department of Defense, **Amendment**
Jetter, Antonie, *Policy Scenarios for Fire-adapted Communities: Understanding Stakeholder Risk perceptions by Measuring Mental Models, using Fuzzy Cognitive Maps*, **MCECS** $181,093, Bureau of Land Management, **New**
Jivanjee, Pauline, *Behavioral Health Workforce Education and Training for Professionals and Paraprofessionals*, **SSW**, $480,000, Health Resources and Services Administration, **New**
Jones, Mark, *TWC: Small: Using a Capability-Enhanced Microkernel as a Testbed for Language-Based Security (CEMLaBS)*, **MCECS**, $324,364, National Science Foundation, **New**
Kelly, Jane, **Peyton, David**, *Preclinical Development of Novel Small Molecule Malaria Drugs that Overcome Drug Resistance*, **CLAS**, $268,398, DesignMedix, **New**
Lehman, Niles, *How Game Theory Applied to Chemistry Can Inform the Origins of Life*, **CLAS**, $196,871, National Aeronautics and Space Administration, **New**
Lucash, Melissa, *Collaborative Proposal: Understanding the Potential for a Climate Change-driven Critical Transition from Forest to Chaparral*, **CLAS**, $296,200, National Science Foundation, New
Lutterschmidt, Deborah, *Neuroendocrine Mechanisms Mediating Differences in Reproductive Timing*, **CLAS**, $545,000, National Science Foundation, **New**
MacArthur, John, **Neal, Margaret**, *Status and Needs for Public Transportation in Oregon*, **CUPA**, $180,865.00, Oregon Department of Transportation, **New**
Mitchell, Melanie, *RI: Small: Visual Situation Recognition: An Integration of Deep Networks and Analogy-Making*, **MCECS**, $449,754, National Science Foundation, **New**
Monsere, Christopher, *Safety Effectiveness of Pedestrian Crossing Enhancements*, **MCECS**, $130,000, Oregon Department of Transportation, **New**
Nicolaidis, Christine, **Oschwald, Mary**, **Powers, Laurie**, *Pregnancy and Support Services for Women with Developmental Disabilities*, **SSW**, $233,886, National Institutes of Health, **New**
Nordback, Krista, *Investigation of Bicycle and Pedestrian Continuous and Short Duration Count Technologies in Oregon*, **CUPA**, $137,000, Oregon Department of Transportation, **New**
Ovall, Jeffrey, *Investigation of Auxiliary Subspace Techniques as a General Tool for A Posteriori Error Estimation*, **CLAS**, $61,552, National Science Foundation, **Amendment**
Pankow, James, *Method Development for Free-base Nicotine Levels (FBNLs) in Mainstream Tobacco Smoke*, **CLAS**, $100,000, Centers for Disease Control and Prevention, **New**
Parnell, William, *Child Care and Family Support at an Urban University: A Plan for Student Access and Success*, **GSE**, $373,871, US Department of Education, New
Richardson, Susan, *Screening, Brief Intervention and Referral to Treatment (SBIRT)*, **SSW**, $2,000,000, Conrad N. Hilton Foundation, **New**
Rosenstiel, Todd, *Lichen Air Quality Bio-monitoring for Nine Wilderness Areas in Utah and Nevada*, **CLAS**, $18,500, USDA, Forest Service, **New**
Ruzicka, Alex, *The Origin of Large, Igneous-textured Inclusions in Ordinary Chondrites*, **CLAS**, $62,000, National Aeronautics and Space Administration, **Amendment**
Scheller, Robert, *Collaborative Proposal: Understanding the Potential for a Climate Change-driven Critical Transition from Forest to Chaparral*, **CLAS**, $296,200, National Science Foundation, **New**
Shusterman, Gwen, *PSI -- Portland State University STEM Initiative: Supporting Teaching and Engaging Minds in STEM*, **CLAS**, $2,000,000, Howard Hughes Medical Institute, **New**
Singer, Jeffrey, *The Role of the Cul3-mediated Ubiquitination Pathway in ASD*, **CLAS**, $59,340, Simons Foundation, **New**
Singer, Laurel, *BLM OR/WA CESU Oregon Consensus Facilitation for Resource Management Plans*, **CUPA**, $200,000, Bureau of Land Management, **New**
Stuart, David, *Direct Carbon-Carbon Bond Forming Reactions with Hypervalent Iodine Reagents: Redefining Formal SNAr Reactivity with Carbon Nucleophiles* **CLAS**, $110,000, American Chemical Society, **New**
Wallack, Lawrence, *Evaluating Media Messaging on Childhood Obesity to Inform Advocacy on a Culture of Health*, **CUPA,** $309,090, Robert Wood Johnson Foundation, **New**
White, Diana, *Aging and Disability Resource Connection Centers (ADRC) Mental Health Funding*, **CUPA**, $215,694, Oregon Department of Human Services, **New**
Widenhorn, Ralf, *Collaborative Research: Multimedia Modules for Physics Instruction in a Flipped Classroom Course for Pre-health and Life Science Majors*, **CLAS**, $235,694, National Science Foundation, **New**
Williams, Dilafruz, *Science in the Learning Gardens: Factors that Support Racial and Ethnic Minority Students' Success in Low-income Middle Schools*, **GSE**, $146,831, National Science Foundation, **New**
Xie, Fei, *CSR: Small: Hardware/Software Co-Monitoring*, **MCECS**, $496,737, National Science Foundation, **New**
Yatchmenoff, Diane, *Adverse Childhood Events and Trauma Collaborative Center (ACETCC)*, **SSW**, $785,000, Oregon Health Authority, **New**
Zelick, Randy, *Acoustic Differentiation of Northern Red-Legged Frog Populations*, **CLAS**, $61,997, National Science Foundation, **New**
Zwick, Martin, *Concussion Definition Consortium - An Evidenced Based Project*, **CLAS**, $46,392, Oregon Health and Science University, **New**

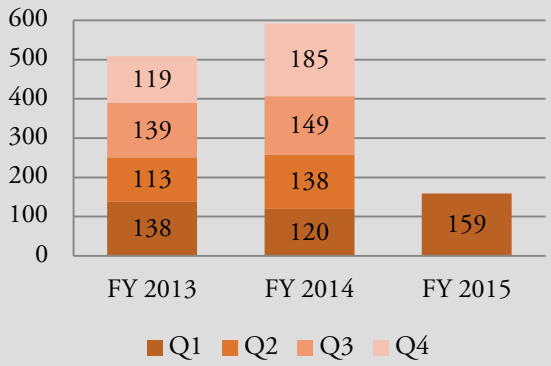
View the Complete List of Awards
http://www.pdx.edu/research/awards-fy15-q1

Research Snapshot

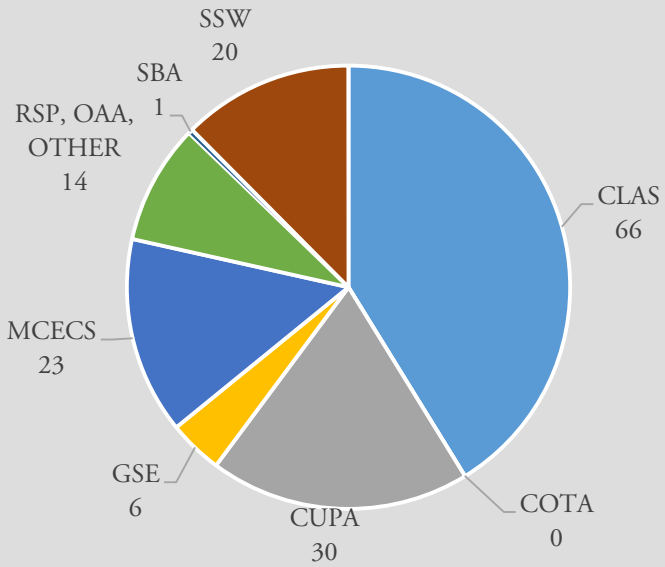
First Quarter, Fiscal Year 2015

Proposals Submitted Q1, 2015

Proposals Submitted



Number of Proposals Submitted



Selected Proposals

View the Complete List of Proposals
http://www.pdx.edu/research/proposals-fy15-q1

Appleyard, Melissa, Jetter, Antonie, Mathwick, Charla, McNames, James, *Start It: PSU iCorps Site Program*, **SBA**, National Science Foundation, $299,772

Ballhorn, Daniel, *The impact of symbiotic nitrogen fixation on plant defense, herbivores and higher trophic levels*, **CLAS**, National Science Foundation, $515,994

Barsanti, Kelley, *Characterizing the Effects of Expanded Biofuels Use in Light Duty Gasoline Vehicle on Primary and Secondary Air Pollutants*, **MCECS**, UC Davis, $557,218

Bass, Robert, Hu, Huafen, *Residential Heat Pumps for Demand Response*, **MCECS**, Portland General Electric, $147,415

Borgmeier, Christopher, *Training for Evidence-based Classroom Habits (TEACH)*, **GSE**, US Department of Education, $1,498,503

Borgmeier, Christopher, Loman, Sheldon, *Efficient Function-Based Intervention: Feasible and Effective Training for School Personnel to Intervene with Students with Challenging Behavior (E-FIT)*, **GSE**, US Department of Education, $1,473,827

Brown, Kim, "CAREER: Physiological Effects of Differential Intestinal Microbiome Populations in Freshwater Migrating Steelhead Smolts," CLAS, National Science Foundation, $999,883

Burcsu, Theresa, Kagan, James, *SageCon Plan Completion and Implementation*, **CLAS**, Oregon Watershed Enhancement Board, $69,954

Burk, Patrick, Cellarius, Karen, McGee, Margie, Trinidad, Alma, *Dimensions. The short term for it in your system may be REAP, the name of our partner organization*, **GSE**, US Department of Education, $1,500,000

Castek, Jill, Reder, Stephen, *Training Researchers to Use PIAAC to Further Multidisciplinary Research*, **CLAS**, US Department of Education, $918,743

Crum, Eric, *PDX Technical Assistance Program FY13/14*, **CUPA**, Port of Portland, $414,689

Delcambre, Lois, Fountain, Robert, Maier, David, Mitchell, Malanie, Tufte, Kristin, *Training for Data Intensive Decision Support*, **MCECS**, Oregon Health and Science University, $948,895

Deur, Douglas, *Produce a Telaquana Trail Cultural Landscape Report for LACL*, **CLAS**, National Park Service, $176,000

Research Snapshot

Selected Proposals, Continued

Duh, Jiunn-Der, *USDA National Water and Climate Center (NWCC) Spatial Services-Watershed Analysis Internet GIS*, **CLAS**, US Department of Agriculture, $205,301

Duffield, Deborah, *Does Captive Breeding Lead to Domestication? A Genetic and Behavioral Analysis of Captive-bred Pandas*, **CLAS**, National Science Foundation $249,978

Elliott, Debra, *Couples with cancer: Beyond the first year*, **OTHER**, Oregon Health and Science University, $115,806

Falco, Ruth, Loman, Sheldon, Sennott, Samuel, Young Helen, *Extensive Support Teams Project*, **GSE**, US Department of Education, $1,499,914

Fallon, Ann Marie, Starry, Olyssa, York, Harry, *The Natural Polis: Are Cities Natural?*, **OTHER**, National Endowment for the Humanities, $30,888

Flynn, Erin E., *A Year in Stories: Story Circles in the Preschool Classroom*, **SSW**, Foundation for Child Development, $139,876

Gil-Kashiwabara, Eleanor, Rockhill, Anna, *MIECHV Expansion Project Evaluation* , **SSW**, Oregon Public Health Division, $751,700

Goforth, Andrea, McCormick, Theresa, Stuart, David, *SusChEM: Development of Silicon Nanoparticle Sensitized Nickel (II) Photocatalysts for Water Reduction*, **CLAS**, National Science Foundation, $424,316

Gonzales, Kelly, *First Air Study: Addressing air quality and asthma in a Native American community*, **CUPA**, Oregon State University, $238,469

Grehan, James, Middle Eastern National Resource Center and FLAS, **CLAS**, US Department of Education, $1,471,568

Ingle, Marcus, PSU - US Embassy - Vietnam Partnership for 20th Anniversary Normalization Events, CUPA, US Department of State, $500,000

Jay, David, Talke, Stefan, *Nonlinear and Non-Stationary Tides in Tidal-Rivers ad River-Estuaries*, **MCECS**, National Science Foundation, $660,871

Johannson, Erik, *CAREER: Maximizing the photovoltage potential of pyrite/liquid junctions through surface chemistry*, CLAS, National Science Foundation, $616,100

Johnson, Gwynn, *Using high volume waste products to replace coal for electrical generation*, **MCECS**, Oregon BEST, $103,063

Kecskes, Kevin, Tint, Barbara, *Middle East Partnership Initiative (MEPI) Student Leaders*, **CUPA**, US Department of State, $289,988

Kelley, Sybil, *CAREER: Increasing STEM and Environmental Literacy using learning gardens, systemic approaches, and teacher training to reinvigorate children's inherent love for learning,* **GSE**, National Science Foundation, $523,038

Klein, Charles, *Collaborative Research: Making Sense of Mobility and Precarity: Emergent Lifeways and Citizen Identities among Brazil's "New Middle Class,"* **CLAS**, National Science Foundation, $522,232

Liu, Feng, *CAREER: Visual Plausibility: Metrics, Techniques, and Applications*, **MCECS**, National Science Foundation, $442,037

Mankowski, Eric, *NSF Graduate Research Fellowship Program: Rachel Smith*, **CLAS**, National Science Foundation, $132,000

McClintock, Nathan, *Urban agriculture, policy-making, and sustainability: A mixed-methods comparative study*, **CUPA**, National Science Foundation, $399,982

Meekisho, Lemmy, *OMI: Characterization of Mechanical Properties of Pipe Sections Resulting from Multi-Step Forming Process*, **MCECS**, EVRAZ North America $50,000

Morse, Jennifer, *Collaborative research: Terrestrial denitrification and global environmental change*, **CLAS**, National Science Foundation, $522,608

Nicolaidis, Christina, *Community Linkages to Improve the Health of African Americans,* **SSW,** African American Health Coalition, $599,775

Noll, Jennifer, *Research on College and Underrepresented Students' Development of Core Statistical Ideas through Dynamic Technologies and New Curriculum*, **CLAS**, National Science Foundation, $974,758

Nordback, Krista, *Walking and Cycling Toward Better Transportation*, **OTHER**, US Department of Transportation, $214,964

Pankow, James, *Method Development for free-base nicotine levels (FBNLs) in mainstream tobacco smoke***, CLAS**, Centers for Disease Control and Prevention, $100,000

Parnell, William, *Child Care and Family Support at an Urban University: A Plan for Student Access and Success*, **GSE**, US Department of Education, $1,487,508

Rudolph, Maxwell, *Role of Elastic and Thermoelastic Stresses in Promoting Convective Resurfacing on Europa*, **CLAS**, National Aeronautics and Space Administration, $138,497

Rynerson, Charles, *PPS Enrollment Forecasts*, **CUPA**, Portland Public Schools, $101,400

Siderius, T. Martin, *Bottom Loss Estimation Using Compact Arrays and Autonomous Underwater Vehicles*, **MCECS**, Office of Naval Research, $299,762

Strecker, Angela, CAREER: *Metacommunity dynamics in a changing spatial and environmental mosaic; The importance of dispersal, gene flow, and eco-evolutionary interactions*, **CLAS**, National Science Foundation, $698,998

Stuart, David, *Career: Discovery and Development of New Arylation Reactions with Hypervalent Iodine*, **CLAS**, National Science Foundation, $626,175

Talke, Stefan, *CAREER: Modeling 19th-century estuaries to address 21st-century problems*, **MCECS**, National Science Foundation, $499,657

Tremoulet, Andree, *Transportation Agencies and Homeless Populations: Emerging Best Practices in Environmental Justice*, **CUPA**, Federal Highway Administration $137,864

Walker, Janet, *Research and Training Center for Pathways to Positive Futures: Building Self-Determination and Community Living and Participation*, **SSW**, US Department of Education, $4,375,000

Wang, Liming, *Characterizing the Effects of Expanded Biofuels Use in Light Duty Gasoline Vehicle on Primary and Secondary Air Pollutants*, **CUPA**, UC Davis $557,218

Weislogel, Mark, *A Thermally Conditioned Iconic Liquid Direct Air Contactor for Compact, Reliable, Energy Efficient CO2 Removal*, **MCECS**, National Aeronautics and Space Administration, $500,000

White, Diana, *Investment for Senior and Mental Health Specialists*, **CUPA**, Oregon Health Authority, $390,000

Yi, Sung, *Ecosystem for Learning and Team Design*, **MCECS**, Imagars, LLC, $49,833

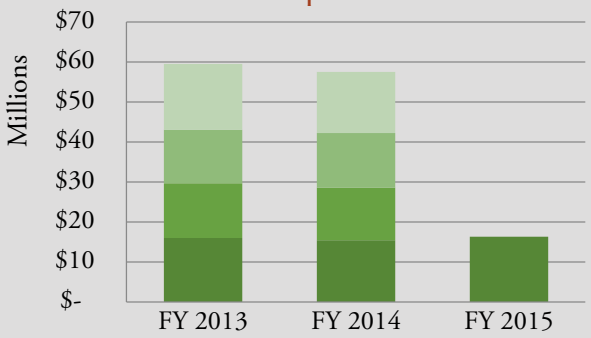
View the Complete List of Proposals
http://www.pdx.edu/research/proposals-fy15-q1

Research Snapshot

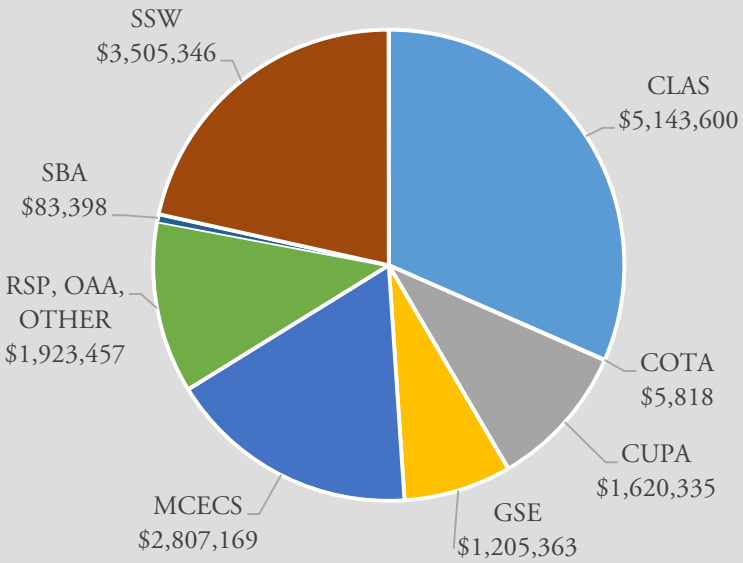
First Quarter, Fiscal Year 2015

Research Expenditures Q1, 2015

Total Expenditures



Total Expenditures



Q1 Publications

View the Complete List of Publications
http://www.pdx.edu/research/fac-pubs-q1-fy15

Abelson, M. J. (2014, September). Dangerous Privilege: Trans Men, Masculinities, and Changing Perceptions of Safety. In Sociological Forum (Vol. 29, No. 3, pp. 549-570).

Ballhorn, D. J., & Elias, J. D. (2014). Salinity-mediated cyanogenesis in white clover (Trifolium repens) affects trophic interactions. Annals of botany, 114(2), 357-366.

Bodner, T., Kraner, M., Bradford, B., Hammer, L., & Truxillo, D. (2014). Safety, Health, and Well-Being of Municipal Utility and Construction Workers. Journal of Occupational and Environmental Medicine, 56(7), 771-778.

de Alcantara Bonfim, O. F., Saguia, A., Boechat, B., & Florencio, J. (2014). Quantum phase transitions in a chain with two-and four-spin interactions in a transverse field. Physical Review E, 90(3), 032101.

Cao, Q., Fu, M., Liu, G., Zhang, H., Yan, S., Chen, Y., ... & **Jiao, J.** (2014). Local vibrational modes competitions in Mn-doped ZnO epitaxial films with tunable ferromagnetism. Journal of Applied Physics, 115(24), 243906.

Carney, N., Ghajar, J., Jagoda, A., Bedrick, S., Davis-O'Reilly, C., **du Coudray, H.**, ... & Riggio, S. (2014). Concussion Guidelines Step 1: Systematic Review of Prevalent Indicators. Neurosurgery, 75, S3-S15.

Carney, N., Ghajar, J., Jagoda, A., Bedrick, S., Davis-O'Reilly, C., **du Coudray, H.**, ... & Riggio, S. (2014). Executive Summary: Concussion Guidelines Step 1: Systematic Review of Prevalent Indicators. Neurosurgery.

Chigwada, T., Mbiya, W., Chipiso, K., & Simoyi, R. H. (2014). S-Oxygenation of Thiocarbamides V: Oxidation of Tetramethylthiourea by Chlorite in Slightly Acidic Media. The Journal of Physical Chemistry A, 118(31), 5903-5914.

Devlin, A. T., Jay, D. A., Talke, S. A., & Zaron, E. (2014). Can tidal perturbations associated with sea level variations in the western Pacific Ocean be used to understand future effects of tidal evolution?. Ocean Dynamics, 64(8), 1093-1120.

Research Snapshot

Q1 Publications, Continued

Duveneck, M. J., Scheller, R. M., & White, M. A. (2014). Effects of alternative forest management on biomass and species diversity in the face of climate change in the northern Great Lakes region (USA). Canadian Journal of Forest Research, 44(999), 700-710.

Emil, S., & **Cress, C.** (2014). Faculty perspectives on programme curricular assessment: individual and institutional characteristics that influence participation engagement. Assessment & Evaluation in Higher Education, 39(5).

Gebbie, J., Siderius, M., Nielsen, P. L., & Miller, J. (2014). Passive localization of noise-producing targets using a compact volumetric array. The Journal of the Acoustical Society of America, 136(1), 80-89.

Gladish, J. C., & Duncan, D. D. Alignment and temperature effects in liquid crystal-based active polarimetry.

Gowen, L. K., Catania, J. A., Dolcini, M. M., & Harper, G. W. (2014). The Meaning of Respect in Romantic Relationships Among Low-Income African American Adolescents. Journal of Adolescent Research, 0743558414528978.

Hillman, S. S., Hedrick, M. S., & Kohl, Z. F. (2014). Net cardiac shunts in anuran amphibians: Physiology or physics?. The Journal of Experimental Biology, jeb-105536.

Ingle, A., Moezzi, M., Lutzenhiser, L., & Diamond, R. (2014). Better home energy audit modeling: incorporating inhabitant behaviours. Building Research & Information, (ahead-of-print), 1-13.

Jenson, R. M., **Wollman, A. P., Weislogel, M. M.**, Sharp, L., Green, R., Canfield, P. J., ... & Dreyer, M. E. (2014). Passive Phase Separation of Microgravity Bubbly Flows using Conduit Geometry. International Journal of Multiphase Flow.

Jetter, A. J., & Kok, K. (2014). Fuzzy cognitive maps for futures studies-a methodological assessment of concepts and methods. Futures.

Kansagara, D., Tuepker, A., Joos, S., **Nicolaidis, C.**, Skaperdas, E., & Hickam, D. (2014). Getting Performance Metrics Right: A Qualitative Study of Staff Experiences Implementing and Measuring Practice Transformation. Journal of general internal medicine, 1-7.

Lee, S. H., McKeen, S. A., & **Sailor, D. J.** (2014). A regression approach for estimation of anthropogenic heat flux based on a bottom-up air pollutant emission database. Atmospheric Environment, 95, 629-633.

Liu, J., Ye, X., Zhou, J., & **Song, X.** (2014). I/O Conformance Test Generation with Colored Petri Nets. Applied Mathematics & Information Sciences, 8(6), 2695-2704.

Liu, X. M., Teng, F. Z., Rudnick, R. L., McDonough, W. F., & **Cummings, M. L.** (2014). Massive magnesium depletion and isotope fractionation in weathered basalts. Geochimica et Cosmochimica Acta, 135, 336-349.

Livneh, H., & Martz, E. (2014). Coping strategies and resources as predictors of psychosocial adaptation among people with spinal cord injury. Rehabilitation psychology, 59(3), 329.

Loudermilk, E. L., Stanton, A., **Scheller, R. M.**, Dilts, T. E., Weisberg, P. J., Skinner, C., & Yang, J. (2014). Effectiveness of fuel treatments for mitigating wildfire risk and sequestering forest carbon: A case study in the Lake Tahoe Basin. Forest Ecology and Management, 323, 114-125.

Marchand, G. C., & **Furrer, C. J.** (2014). Formative, Informative, and Summative Assessment: The Relationship Among Curriculum-Based Measurement of Reading, Classroom Engagement, and reading Performance. Psychology in the Schools, 51(7), 659-676.

Melius, M. S., Tutkun, M., & Cal, R. B. (2014). Solution of the Fokker–Planck equation in a wind turbine array boundary layer. Physica D: Nonlinear Phenomena, 280, 14-21.

Mercer, C. A., & Eppley, S. M. Kin and sex recognition in a dioecious grass. Plant Ecology, 1-8.

Parat, F., **Streck, M. J.**, Holtz, F., & Almeev, R. (2014). Experimental study into the petrogenesis of crystal-rich basaltic to andesitic magmas at Arenal volcano. Contributions to Mineralogy and Petrology, 168(2), 1-18.

Qian, W., Greaney, P. A., **Fowler, S., Chiu, S. K., Goforth, A. M., & Jiao, J.** (2014). Low-Temperature Nitrogen Doping in Ammonia Solution for Production of N-Doped TiO2-Hybridized Graphene as a Highly Efficient Photocatalyst for Water Treatment. ACS Sustainable Chemistry & Engineering, 2(7), 1802-1810.

Reyes, J., **Wooster, R.**, & Shirrell, S. (2014). Regional trade agreements and the pattern of trade: A networks approach. The World Economy.

Sabatini, F. M., Burton, J. I., **Scheller, R. M.**, Amatangelo, K. L., & Mladenoff, D. J. (2013). Functional diversity of ground-layer plant communities in old-growth and managed northern hardwood forests. Applied Vegetation Science.

Sage-Lauck, J. S., & Sailor, D. J. (2014). Evaluation of phase change materials for improving thermal comfort in a super-insulated residential building. Energy and Buildings, 79, 32-40.

Sager, A. (2014). Normative Ethics after Pragmatic Naturalism. Metaphilosophy, 45(3), 422-440.

Vinikoor-Imler, L. C., Davis, J. A., Meyer, R. E., **Messer, L. C.**, & Luben, T. J. (2014). Associations between prenatal exposure to air pollution, small for gestational age, and term low birthweight in a state-wide birth cohort. Environmental research, 132, 132-139.

Wiewel, W. (2014). Review: The Dynamic Decade: Creating the Sustainable Campus for the University of North Carolina at Chapel Hill, 2001-2011. Journal of Planning Education and Research, 34(3), 355-357.

Xie, M., Hannigan, M. P., & Barsanti, K. C. (2014). Impact of Gas/Particle Partitioning of Semivolatile Organic Compounds on Source Apportionment with Positive Matrix Factorization. Environmental science & technology, 48(16), 9053-9060.

Yang, L. Q., Caughlin, D. E., Gazica, M. W., Truxillo, D. M., & Spector, P. E. (2014). Workplace Mistreatment Climate and Potential Employee and Organizational Outcomes: A Meta-Analytic Review From the Target's Perspective. Journal of occupational health psychology.

Zaron, E. D., & Jay, D. A. (2014). An Analysis of Secular Change in Tides at Open-Ocean Sites in the Pacific. Journal of Physical Oceanography, (2014).

View the Complete List of Publications
http://www.pdx.edu/research/fac-pubs-q1-fy15

Research Snapshot

Doctoral Degrees Conferred, Summer 2014

Arlie Steven Adkins, Ph.D.
Dissertation Chair: **Jennifer Dill**, CUPA
Dissertation title: Determinants of Recent Mover Non-work Travel Mode Choice

Jennifer Anne Anderson, Ed.D.
Dissertation Chair: **Michael Smith**, GSE
Dissertation title: Understanding Male Nursing Student Perceptions of the Influence of Gender: A Qualitative Case Study Approach of Students, Faculty, and Administration in a Pacific Northwest Nursing Program

Thomas Joseph Dornan, Ph.D.
Dissertation Chair: **Jonathan Abramson**, CLAS
Dissertation title: Calcium Transport Inhibition, Stimulation, and Light Dependent Modulation of the Skeletal Calcium Release Channel (RyR1) by the Prototropic Forms of Pelargonidin

John Thomas Gebbie, Ph.D.
Dissertation Chair: **T. Martin Siderius**, MCECS
Dissertation title: Advances in Aquatic Target Localization with Passive Sonar

Yongwen Gu, Ph.D.
Dissertation Chair: **Drake Mitchell**, CLAS
Dissertation title: The Effect of Docosahexaenoic Acid (DHA) -Containing Phosphatidylcholine (PC) on Liquid-Ordered and Liquid-Disordered Coexistence

Sirisha Murthy Kothuri, Ph.D.
Dissertation Chair: **Christopher Monsere**, MCECS
Dissertation title: Exploring Pedestrian Responsive Traffic Signal Timing Strategies in Urban Areas

Will Albert Landecker, Ph.D.
Dissertation Chair: **Melanie Mitchell**, MCECS
Dissertation title: Interpretable Machine Learning and Sparse Coding for Computer Vision

Karen Elizabeth Maxwell, Ed.D.
Dissertation Chair: **Candyce Reynolds**, GSE
Dissertation title: Designing the Plane While Flying It: A Case Study on Nursing Faculty Development during Academic Electronic Health Records Integration in a Small Liberal Arts College

Maria Janeth Mosquera Becerra, Ph.D.
Dissertation Chair: **Veronica Dujon**, CLAS
Dissertation title: Socio-spatial Transformation and Contested Space at the Street Level in Latin America: The Case of Cali, Colombia

Philip Christopher Palmedo, Ph.D.
Dissertation Chair: **Mark Kaplan**, CUPA
Dissertation title: Equality, Trust and Universalism in Europe, Canada and the United States: Implications for Health Care Policy

Jolanta Maria Piatkowska, Ph.D.
Dissertation Chair: **Eileen Brennan**, SSW
Dissertation title: The Relationship between Mindfulness and Burnout among Master of Social Work Students

Erin Elizabeth Shortlidge, Ph.D.
Dissertation Chair: **Sarah Eppley**, CLAS
Dissertation title: Testing the Ecological and Physiological Factors Influencing Reproductive Success in Mosses

Matthew Alan Town, Ph.D.
Dissertation Chair: **Matthew Carlson**, CLAS
Dissertation title: Racism, Heterosexism, Depression, and HIV Risk Behaviors of Native Men Who Have Sex With Men: Findings from the HONOR Project

Wendy Elaine Viola, Ph.D.
Dissertation Chair: **Eric Mankowski**, CLAS
Dissertation title: Social Networks of Intimate Partner Violence Perpetrators

Research & Strategic Partnerships

Quarterly Review, Volume II, Issue I

Portland State
UNIVERSITY

Scenes from Rwanda where Professor Evan Thomas and DelAgua Health work to reduce childhood mortality from diarrhea and pneumonia.

Portland State UNIVERSITY

www.pdx.edu/research