Compensation Costs
PSU’s Center for Public Service develops software government agencies use to calculate the cost of personnel services.

eLearning
GSE faculty members embark on new projects developing eLearning platforms to meet the needs of underserved communities.

Heart Health
NIH awards PSU startup Elex Biotech $1.52M to develop and test new compounds that treat heart failure.
As a volcanologist and a skier, I’m partial to images like this issue’s cover photo. Mount Hood is also the signature landscape feature for our city and region, providing us with fresh water, recreation, and a distinctive natural background. Similarly, Portland State University’s downtown campus, its student body, its faculty, and its research portfolio offer Portland an equally striking educational, cultural, and economic backdrop.

The eleven stories in this Winter 2015 edition of the Research and Strategic Partnerships Quarterly Review explore an assortment of faculty and staff accomplishments, revealing common themes of technologic innovation, public policy, strategic partnership, and improving human health. I invite you to take a look at them.

But before you do, turn first to pages 14-20, and take a few minutes to scan through the lists of grants received, proposals submitted, articles published, and doctoral degrees conferred. The cumulative impact of this highly diverse scholarship reflects our growing maturation as an urban-serving research university that anchors our host city.

Among PSU’s greatest assets are the distinguished public service leaders that join our faculty and staff, three of whom are highlighted in this issue. The lead story describes how PSU’s Center for Public Service (CPS) has been evaluating the true cost of employing Oregon’s municipal government workers. Their surprising finding is that the sum of secondary benefits received by public service employees roughly equals their base pay. With funding from our Innovation and Intellectual Property office, CPS Director and former Oregon Secretary of State Phil Keisling and his team have developed a copyrighted software package that allows governments around Oregon (and elsewhere in the world) to more accurately determine the complex costs of maintaining their workforce.

Another of PSU’s strengths is our sustainability expertise. So it’s not surprising that the Oregon Legislature asked economists in our Northwest Economic Research Center (NERC) to evaluate the impact of proposed carbon-pricing schemes. Their results, as described by NERC Director and former state economist Tom Potiowsky, suggest that a carbon tax or cap and trade system would slow the release of CO₂, cause minimal disruption to the Oregon economy and align the state with pioneering neighbors like California and British Columbia that are already taking serious actions to address global warming.

First and foremost, PSU is an institution that delivers instruction and conducts research. But as one of Oregon’s largest employers and suppliers of talent it also has an outsized influence on our region’s fiscal health. In a third entry, President Wim Wiewel introduces a new report on PSU’s $1.5B economic impact. Erin Flynn, Associate Vice President of Strategic Partnerships and former director of urban development for the Portland Development Commission, prepared the report with her staff.

Among the ways PSU influences the economy is through research grants and startup companies. Three stories in this issue describe significant new awards won by faculty members. Corey Griffin (Architecture) received $300K from the prestigious Keck Foundation for a new lab in which to teach the science of buildings. $1M from the Oregon Department of Education will support a partnership to improve math instruction between the Graduate School of Education and two east Portland school districts. Startup company Elex Biotech, co-founded by Rob Strongin (Chemistry) and Jonathan Abramson (Physics), took in $1.54M from the National Institutes of Health to develop new drugs to treat cardiac disorders.

Another health-related story involving the Chemistry Department has received a great deal of media attention. Professors David Peyton, James Pankow, and Rob Strongin published a paper in the influential New England Journal of Medicine on the chemistry of smoke from e-cigarettes. First hailed as a panacea to help people escape the deadly influence of tobacco, the PSU research shows that e-cigarettes’ health effects may not be so benign.

Two stories show how faculty members in our Department of Special Education use the latest technology to increase the effectiveness and positive impacts of reading. In Sam Sennott’s Universal Design Laboratory, smartphone and tablet apps help caregivers design reading experiences to improve the communication skills of developmentally disabled children. Holly Lawson and colleagues are creating web-based tools and games to help blind people prepare for a new form of braille to be rolled out next year. In both cases, the goal is to use reading to assist special populations better integrate into society.

Speaking of learning, games and communities, you can also read how Professor Harrell Fletcher’s Art as Social Practice MFA students are partnering with middle school children at Northeast Portland’s King School to create a ‘living museum’ filled with artifacts reflecting the history, culture, and identity of their neighborhood. Finally, a story about English Professor Michael Clark’s initially serendipitous investigation of play reveals its common roots with religion. Perhaps this is unsurprising, given the fervor with which some of our students and kids engage with video games and other online pursuits.

When we add up these and other stories about PSU’s accomplishments, you understand why community, business, and government leaders, along with parents and teachers throughout our region increasingly see Portland State as their common touch point, rising in stature like our snow-clad neighbor to the east.

Jonathan Fink, Vice President Research and Strategic Partnerships
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Understanding the Total Employer Cost of Compensation

By Shaun McGillis

Few questions are as politically charged in the U.S. today as the issue of whether the public receives its money’s worth for government services. Asking these same agencies to answer the question is also problematic, because of real or perceived conflicts of interest.

For nearly two decades, Portland State University’s Center for Public Service (CPS) has tried to fill this gap as an honest broker, enhancing “the legitimacy and effectiveness of public service institutions and democratic governance” by connecting the research, consulting and educational capabilities of the Hatfield School of Government to jurisdictions throughout Oregon and Southwest Washington.

In 2012, CPS conducted a study of the cost of government personnel services in and around Oregon,1 which until that point had been too little understood by most budget officials, managers, employees and tax payers. The resulting *Public Sector Total Employer Cost of Compensation* (TECC) study provided information detailing the actual costs of employing public service workers to participating partners—including the state of Oregon, 11 cities and ten counties throughout Oregon and Southwest Washington, and the public. The final figures combined worker base pay with other expenditures such as non-base pay, vacation, holiday and sick leave, overtime, insurance (health, unemployment and workers’ compensation), and post-employment (retirement and medical costs).2 When the study was completed, CPS produced a first of its kind, cross-jurisdictional comparative analysis of the total expenses associated with employing personnel to fulfill essential roles within government. Across the board, the findings indicated that the sum of the aforementioned benefits were roughly comparable to employees’ base pay (Center for Public Service, 2012).

While the report enabled the 23 participating jurisdictions to make more informed decisions when budgeting for personnel services so they might better manage their limited financial resources, it also had its limitations. The data was largely from 2010 and only applied to several dozen government entities. A number of local governments approached CPS and its director—former Oregon Secretary of State Phil Keisling—to express interest in creating a TECC-like tool and database containing aggregate data, updated yearly, for the benefit of all cities and counties in Oregon, and in other states around the country.

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1. “Personnel services,” or the costs associated with compensating employees, are consistently titles (refer to the report for a list of positions).
“For any government, its employees are far and away its greatest asset, and also its greatest expense,” Keisling said. “The 2012 report was an eye-opener for a lot of folks. No one had pulled all these costs together in this way before. No one knew how the price tag for total compensation varied year to year and from jurisdiction to jurisdiction. For a lot of people, this was really useful information they had never looked at before.”

According to Keisling, responses to the report from study participants indicated a need for a standardized platform on which governments could easily enter detailed data pertaining to compensation rates, other pay, leave, and the cost of taxes and insurance for specific job titles. Ideally, this platform would then track that information over time and drive ‘apples-to-apples’ comparisons with similar positions in other jurisdictions throughout the state. Not only could such information improve how cities and counties manage their budgets, it also had the potential to change the framework of how elected officials, resource managers, employees, and the public think of government personnel costs, which may promote a more open, sophisticated dialogue between all parties involved about how best to compensate public service workers.

To create the TECC-type calculator cities and counties needed, Keisling began working with PSU’s Innovation & Intellectual Property office, which provided financial assistance through the University Venture Development Fund to get the software development going and tactical support in managing licensing agreements with users when the platform went online. The Total Employer Cost of Compensation tool is now in beta testing with 15 partner jurisdictions and plans to have at least 50 jurisdictions enrolled in the subscription-based service by the summer of 2015. Marion County is one of those testers.

“When conducting recruitment efforts, regularly scheduled market reviews and preparing for required compensation reviews for bargaining sessions, we in HR want really hard to find a simple, cost effective and time efficient way to adequately assess and compare total compensation. This tool allows us to do that.”

Keisling likens the user experience to that of Quicken or Intuit financial management software systems. Once a record is entered, the program can break the cost data for a position into yearly, monthly and even hourly rates. When a jurisdiction’s entries are completed, the TECC calculator reports on individual and overall costs, and the TECC team can then prepare customized reports that compare TECC costs to those of other cities and counties in Oregon, taking into account how long an employee has been in service, differences in non-base pay, insurance and so on.

“We learned so much from the work we did on TECC 2.0,” Keisling said. “Because of that experience, we were able to develop a common methodology and tool kit to gather all the disparate costs public employers incur and turn that into a product line that has real value for cities, counties, the state and tax payers. We looked around the country to see if there was any other tool like this out there. We couldn’t find anything comparable. That has made us a real ‘go-to’ player for other communities and organizations in Oregon. And it’s a great example of how the knowledge that we build at PSU and our capacity to enter into partnerships can lead to great innovations, provide new ways of looking at government, and improve the ways we manage its resources.”


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**Chart 1: Average total employer cost of compensation by component for all participating jurisdictions and job titles grouped by state of Oregon, city and county.**

<table>
<thead>
<tr>
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<th>Top Step</th>
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</tr>
<tr>
<td>Total</td>
<td>$78,615</td>
</tr>
</tbody>
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3. The TECC platform has expanded from the original 11 job titles analyzed in the 2012 report to 70 today. Users inputting data narrow the range of titles by answering questions related to workers’ specific duties. The expansion provides a more comprehensive evaluation of how highly specialized positions are compensated for in jurisdictions throughout the state.

4. The Bureau of Labor Statistics regularly publishes a report on the “Employer Costs for Employee Compensation” that includes public and private sector data. The numbers provided by the government, however, represent national averages and divide workers into three categories: management, professional, and related workers. While the data is useful for gaining a sense of the median total costs of employee compensation nationwide, at the local level it provides resources managers little useful information.
Portland State University is becoming a national leader in research that leads to improvements in quality of life for individuals with developmental disabilities such as autism, Down syndrome, and cerebral palsy. Faculty from units including the School of Social Work and the Departments of Speech & Hearing Sciences and Special Education create and enhance diagnostic tools that promote the health, education, communication, and general wellbeing of those within this population.

Assistant Professor of Special Education Samuel Sennott is one of the newest additions to this team. Proudly displaying the techie qualities common among this cohort, Dr. Sennott was the first faculty member to use Google Glass to better “read” information in his environment. Fittingly, his research program seeks to help some of society’s most challenged readers to better learn about their world.

In his Universal Design Laboratory (uLab), Dr. Sennott leverages technologies like smartphones and tablets to create innovative platforms and apps that facilitate shared reading experiences, hone emergent literacy and communication skills, and make it possible for individuals without speaking ability to better express themselves. He co-developed Proloquo2Go, a highly successful symbol-based app for the iPad and iPhone that helps thousands of people with complex communication needs to find their voices.

One of Dr. Sennott’s primary tools is a practice called “shared storybook reading,” a suite of techniques that intentionally engage adults and children in the reading experience. These include allowing children to select what story to read, pausing to make time for discussion, matching content and interactions to expressed interests, and letting children hold and manipulate the books being read. For decades these practices have been known to help the general population acquire language and literacy skills. More recently, researchers like Dr. Sennott are uncovering the positive effects the same exercises have on developmentally disabled children.

According to Dr. Sennott, while adults read with many children with developmental disabilities, the kids commonly miss the full benefits of the experience because of their intensive needs. However, if parents, teachers, and youth service professionals could align their practices to better suit the children and improve the quality, frequency, and duration of time spent reading, these young people might benefit from shared reading in ways similar to that of their peers who do not receive special services.

Dr. Sennott recently launched the “Inclusive, Shared Storybook Reading Project” to design, implement, and evaluate an online training system that equips adults with the know-how to deliver high-quality reading experiences to these children. In order to support this training method, the project team built a web-based book and activity finder to increase access to educational materials and books in homes, at school, and elsewhere. Similarly, they are rolling out a social network platform to promote sustained engagement in shared reading and the open exchange of ideas, materials, and experiences among participants. By weaving together technology, theory, and teaching, Sennott hopes to assist adults caring for young children (ages 0-6) with complex communication needs in communities large and small, urban and rural.

To reach such children within Oregon, the project is using a small grant from the Oregon Department of Education to form partnerships with public and private organizations including Oregon’s Early Learning Hubs (statewide centers focused on early childhood education and school readiness), the Multnomah County Early Childhood Program, PSU’s Helen Gordon Child Development Center and local libraries.
“We’re really excited about this approach,” said Dr. Sennott. “Not only do we expect to see kids acquire basic literacy and communication skills and increase their readiness for kindergarten, we also think the online platform and book finder will be useful for other projects we hope to find federal, state, and foundation funding for in the future.”

In the coming months, Dr. Sennott and his team will invite 35 family members of children with developmental disabilities and 35 early childhood service provider professionals to PSU to participate in a full day inclusive shared storybook reading training session. These 70 individuals will help the team shape and refine the training, gain experience using the online platform and resources, and leave PSU as project evangelists equipped with books to read to children and information about how to participate in the project, which they will be able to pass along to friends and family in their communities and beyond.

“The goal is to help kids gain the reading experiences and skills they’ll need to communicate with others and get ready to enter the school system,” Dr. Sennott said. “We want their parents to read to them more frequently, for longer, and in the most engaged way possible.”

The innovative online approach will give Oregonians across the state new resources at their fingertips to engage and develop early literacy skills. The goal is to reach over 2,500 Oregon children and their families, with the possibility of expanding the project to serve anyone with Internet access.

“I believe shared reading is a fundamental experience missing from the lives of so many kids,” Dr. Sennott said. “With the right training and technology, we can extend that foundation to include children with complex communication needs. And all we have to do to achieve that is reach the adults in these kids’ lives. That’s what this project is focused on, and that’s what we want to do in the uLab: develop and use technologies for research and projects with the potential for major impacts in the real world.”

Dr. Sennott and his junior faculty colleagues continue a long tradition of updating PSU’s community engagement mission with the latest technological innovations. In this case, the results will be expanded opportunities for disabled children and their families to benefit from reading, first throughout Oregon, and later around the world.

Creating 21st Century Tools to Support Braille Learners

Or most sighted people, braille is a curious bumpy code encountered on elevators, at street crossings and outside hotel rooms. For many of the visually impaired, however, braille opens a unique doorway to a world they would otherwise be much less able to navigate. In the early 1990s, five English-speaking countries adopted a major simplification, referred to as the Unified English Braille (UEB) system, as their national standard. In 2016, the U.S. will join this group, requiring many people to essentially learn a new language. The transition will occur on January 6, the birthday of Louis Braille, French inventor of the system.

The National Federation of the Blind estimated in 2012 that there were over 6.2 million visually-impaired, working-aged adults in the U.S., including 83,500 in Oregon (National Federation of the Blind, 2014). Portland State University serves 59 students who are blind or visually impaired. Whether or not these individuals already use the outgoing code, learning UEB will be important if they want to compete in the job market, succeed in higher education, apply for a passport, or cast a vote in an election. UEB literacy will also be critical for professionals and service providers like pre- and in-service teachers, and family members of the visually impaired, all of whom play essential support roles in increasing the use of braille. With the transition date just over the horizon, researchers at PSU are building infrastructure to support efforts to make adult readers and educators proficient in UEB.

Professor Holly Lawson, Coordinator of the Visually Impaired Learner Program in the Department of Special Education, leads the team developing a web-based platform that will aid adult braille users, parents of children who are visually impaired, as well as the professionals who serve them. To accomplish these tasks, Lawson and co-investigators Assistant Professor Samuel Sennott (Special Education) and Associate Professor Christof Teuscher (Electrical and Computer Engineering) have partnered with community members, local and national...
organizations, and experts in the field on a five-year “Unified English Braille through a Powerful and Responsive eLearning Platform” project, or UEB PREP.

UEB PREP will go beyond current braille instructional tools and infrastructure such as transcription manuals, webcasts, and textbooks. While Lawson acknowledges the important role these standard materials continue to play in instruction, she and the rest of the team are eager to explore new approaches. These include interactive, responsive eLearning, gamification, and social networking, all of which are accessible in classrooms, at home, or anywhere, anytime using mobile devices. At the center of UEB PREP is an online platform where users from Oregon and beyond will be able learn at their own pace through study and play and share their progress with others, while a community of educators create, assess and share content and researchers gather data to continually improve the user experience.

“This is going to be a big transition and it’s going to affect a lot of people,” Dr. Lawson said. “Our goal is to help adult learners make that transition and increase braille literacy. To do that we want to create something engaging, a place where users can learn interactively in an adaptive environment, reinforce and develop skills through play, get immediate feedback on their progress, support one another in an online community, and gain the ability to succeed in education and employment.”

Statistics show that less than ten percent of persons considered legally blind are braille readers (Jernigan Institute, 2009). Meanwhile, a mere 38 percent of visually impaired adults aged 21-64 are employed, 19 percent have attained a Bachelor’s degree or higher, and 32 percent live below the poverty line (National Federation of the Blind, 2014). Research has connected braille literacy to higher employment rates, income and education (Ryles, 1996). There is thus an urgent need for evidence-based, 21st century educational materials, tools, and support systems to increase braille literacy among adults and extend the reach and capacity of educators and service providers now and after the implementation of UEB in the U.S. Lawson and her UEB PREP collaborators are working to fill that gap.

The project, supported by a five-year grant from the U.S. Department of Education, aims to initially serve 500 blind and visually impaired adults, current and future educators, and service providers by the end of 2015. This will ramp up to 10,000 users by the end of year five, Lawson noted. The hope is that it will eventually become a thriving, self-sustaining platform capable of meeting the needs of English-speaking UEB teachers and learners wherever an Internet connection exists.

The ultimate goals of the program are to increase the usage of UEB and promote the development of skills that will help visually impaired adults succeed in education and employment. If successful, UEB PREP has the potential to improve the overall quality of life for millions in the U.S. and abroad, while expanding PSU’s portfolio of online learning tools already reaching people throughout the world.

PSU Biomedical Startup Receives $1.54M NIH Grant
By Jonathan Fink, Shaun McGillis, Sandra Shotwell

The steady growth of Portland State University’s biomedical prowess may seem surprising, given its lack of a medical school. However, it makes more sense when one considers how the university invested in its Chemistry, Biology and Physics Departments in recent years by hiring senior scientists, upgrading the Science and Research Teaching Center, and building research and teaching labs in the Collaborative Life Science Building (CLSB) in partnership with Oregon Health and Science University (OHSU) and Oregon State University’s School of Pharmacy. Furthermore, the entrepreneurial renaissance attracting innovators and venture capitalists to Portland from hotbeds like Silicon Valley, San Diego and Seattle is centered in the “Innovation Quadrant,” which encompasses PSU, OHSU, the CLSB, the Portland State Business Accelerator, the Oregon Translational Research and Development Institute’s (OTRADI) Bioscience Incubator and OMSI.

This background provides context for PSU’s most recent biomedical research milestone, the winning of a two-year, $1.54M grant by one of the University’s two pharmaceutical startup companies, Elex Biotech. Elex was co-founded by Professors Rob Strongin, Department of Chemistry, and Jonathan Abramson, Department of Physics, to address the most pressing public health crisis in the United States today: heart failure and related cardiovascular diseases.

Among the most common of those cardiac conditions are heart arrhythmias with the intimidating name of catecholaminergic polymorphic ventricular tachycardia (CPVT), an often fatal inherited disorder caused by an imbalance of calcium, which affects the flow of ions in and out of cardiac cells. CPVT episodes frequently begin in childhood and can go undetected, typically first appearing during physical exertion while playing sports, where irregular heartbeats can prove deadly.

Strongin, Abramson and colleagues Xander Wehrens of Baylor College of Medicine and Guy Salama of the University of Pittsburgh have produced novel compounds that decrease abnormal calcium flows, the cause of CPVT, eliminating arrhythmias in animal models. The NIH grant will allow them to develop and evaluate additional compounds.

“We are very pleased to have this support from the NIH to continue our important work addressing cardiac arrhythmias,” Dr. Abramson said. “CPVT is a devastating disease. Treatment with drug compounds that directly correct the suspected cause of the disease has the potential to reduce the number of arrhythmias and resultant cardiac arrests in these patients.”

Partnership Awarded $1M for Math Education Leadership Program

A partnership led by Portland State University’s Graduate School of Education received a $1 million state grant to improve math instruction in two east Portland school districts.

The East Metro Mathematics Leadership Project will focus on research-based instructional practices that support student mathematics learning while developing teacher leaders in two east Portland districts, David Douglas and Centennial. The Multnomah Education Service District is also a partner on the project.

“This will be a huge opportunity for us,” says Professor Nicole Rigelman, who teaches math methods in PSU’s Graduate Teacher Education Program and coordinates the Mathematics Instructional Leadership Program. “It will enable us to develop a cadre of leaders who can support and sustain teacher learning beyond the life of the grant.”

The project will help math educators in east Portland develop leadership skills, learn research-based math teaching techniques and deepen their knowledge of math content and instruction. The money comes from the Oregon Department of Education through the Elementary and Secondary Education Act, a federal fund that supports math and science partnerships in each state.

“Effectiveness of the project will be measured by student achievement over the three-year life of the grant, along with teacher measures that include content and pedagogy assessments and instructional artifact analysis,” said Amy McQueen, a David Douglas District math specialist.

New and successful strategies will be shared at conferences and professional gatherings and made available to the public through a website to broaden the impact of the work. District leaders hope to develop a model of professional learning that can be replicated by many others, and better prepare students for science, technology, engineering and math careers.

By Nancy Eichsteadt
Graduate School of Education
While walking with a fellow physicist who had declared space a mere ‘field of linear operations,’ Nobel Laureate Werner Heisenberg, one of the giants of his field, quipped, ‘Nonsense. Space is blue and birds fly through it’ (Bloch, 1976).

The anecdote, recounted to commemorate the 50th anniversary of the founding of quantum mechanics, reveals a playful side of the famous scientist, a down-to-earth persona, with which many might easily relate. Why is it that a moment of jest exchanged between people tends to expose our humanity? For that matter, what is it about play that makes us all want to participate in it?

Sociologists, psychologists, anthropologists, political scientists and economists have used experiments, calculations, and theories to address questions like these. PSU’s Professor Michael Clark of the Department of English, who also directs PSU’s Portland Center for Public Humanities, recently joined the ranks of those seeking answers. Drawing from many disciplines, Clark is shaping a unique dialogue about how modern society may be affecting play.

Clark’s examination began serendipitously while he attended a 2014 National Endowment for the Humanities Summer Seminar at the University of Virginia with the theme ‘problems in the study of religion.’ The trip was funded by a Mellon Foundation Religion, Secularism, and Political Belonging grant awarded to Clark and fellow English Department faculty member, Professor John Smyth. Clark, who is a J.D. as well as a Ph.D., was at the Seminar to explore constitutional issues related to the First Amendment’s establishment clause. His inquiries into play, however, began while reading one of the Seminar’s assigned texts, Robert Bellah’s gargantuan Religion in Human Evolution: From the Paleolithic to the Axial Age. As Clark described it, his interest was piqued by a postulation proposed by Bellah.

“Bellah’s fundamental premise,” said Clark, “is that formalized play can be transformed into ritual, which can give rise to religion. And for Bellah, this idea of religious belief is crucial to the human condition in a number of ways, including how it facilitates our ability to form the social groups we exist in.”

Clark, who had not previously studied Bellah’s works, nonetheless recognized intersections between Bellah’s argument and the work of

1. Robert Bellah (Feb. 23, 1927 – July 30, 2013) was a noted American sociologist known for his work on the sociology of religion. His ‘magnum opus’ Religion in Human Evolution was published in 2011 to nearly universal acclaim, as a review in the New York Times noted: “Bellah stands in the tradition of such stalwarts of the sociological imagination as Emile Durkheim and Max Weber. Only one word is appropriate to characterize this book’s subject as well as its substance, and that is ‘magisterial’” (Wolfe, 2011).
Theodore Adorno, who critiqued leisure and free time in capitalist societies,2 These intersections sparked a series of conversations among the seminar’s attendees and formed the core of Clark’s ongoing research thrust. Among the far-reaching questions that emerged was: if play can give rise to important social constructs (e.g. religion), what happens when play is commodified and harnessed for capitalistic ends?

Grasping the major implications of such questions to the human condition requires an understanding of what play is. In his research, Clark turned to scholars ranging from Plato to renowned 20th century theorists including Johan Huizinga and Brian Sutton-Smith. These writers all related play to culture and the self.3 In synthesizing that earlier work, Clark highlighted several characteristics of play including that it is free and out of the ordinary, in contrast to work, which is regimented by factors like time, place, and duties. Further, play is secluded from reality and marked off by time—a stepping out of reality and into a temporary sphere where as an unbound act it creates its own meaning and order.

“Given these characteristics,” Clark said, “one begins to see the connections between play and the sacred. And I think Bellah’s ideas, when put into the context of Adorno’s work, raise some serious questions. Adorno, who I’ve been a scholar of my whole career, noted that play had become so commodified, so polluted by commercial forces that we don’t really know when we’re playing anymore or when we’re consuming products. So given the idea that play has the potential to transform activities into rituals, which then over time might manifest as religion, what is the end result of that process when we can’t draw a line between play and consumerism?”

We may well be on our way to finding out. Over the past few decades, play has (arguably) entered a paradigm shift. As wealth in developed and developing nations has risen around the world, toys and games have become increasingly expensive consumer products. Families are paying more and more for children to participate in little leagues and school athletic programs (Sullivan, 2015). Technologies such as video games as well as social networks and other digital communities are increasingly transforming the nature of play. Academics have identified changes in play habits over generations (Clements, 2004) and the media has reported on the decline of outdoor play as well as participation in organized sports (Wallerson, 2014). All these factors indicate seismic shifts that may be reshaping cultural views and practices related to play.

“There are fundamental transformations going on in what it means to play,” Clark said. “Do these changes invoke classical motifs of play? Play as a form of adaption, play as fate, power, or identity? Play as a break from reality? Play as a form of creativity? To what extent have we been indoctrinated into the idea that we need to ‘pay to play?’ And has that indoctrination been so skillfully carried out that we don’t even notice it anymore? These are questions we need to start asking again.”

Many of PSU’s faculty, students, and staff move to Portland because of its ready access to outstanding recreational and entertainment activities. As we engage in biking, skiing, Ultimate Frisbee, “Grand Theft Auto,” or “Call of Duty,” it’s encouraging to know that our own Michael Clark is exploring the broader significance of these playful pursuits.

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2. Theodore Adorno (Sept. 11, 1903 – Aug. 6, 1969) was an influential mid-20th century German sociologist of the Frankfurt School and a critical theorist well-known for his works on aesthetics, philosophy, music and the seminal Dialectic of Enlightenment (1947), co-authored by Max Horkheimer, in which the two coined the phrase ‘culture industry,’ an idea that casts the products (films, radio, magazines, etc.) of popular culture as what might be described as religion’s replacement as the modern opiate of the masses (Horkheimer & Adorno, 1972).

3. i.e. Plato’s Symposium, The Republic, and Laws; Huizinga’s Homo Ludens; and Sutton-Smith’s The Ambiguity of Play.
Portland State University has a long history of partnering with public and private organizations in the metro region and beyond. Guided by the motto “Let Knowledge Serve the City,” the university builds relationships that address critical social, environmental, and economic issues facing our community. Some partnerships have flourished for years. Others are nascent, full of potential, and ready to affect positive change.

An exciting recent collaboration matches graduate students from the Art and Social Practice Master of Fine Arts (MFA) program in the School of Art and Design with attendees of Portland Public Schools’ Martin Luther King Jr. School in Northeast Portland. Launched in 2006, the Art and Social Practice MFA provides aspiring artists opportunities to create site-specific works by engaging and collaborating with the community. According to Associate Professor Harrell Fletcher, Director of the program, the arrangement with King establishes a “civic space” on the NE 6th Ave. campus. There, graduate students will develop their craft in a PreK-8 context, draw inspiration from the children and neighborhood it serves, and advance socially-engaged art education.

“Social practice” art has existed under various names and forms and in different locations for nearly a century. The concept and many of its practitioners, however, have gained notoriety and received increased critical attention in the U.S. only over the past decade. In response to the expanded recognition, a handful of universities, including PSU, have added social practice MFA programs to their degree offerings. Social practice artists are often highly collaborative and work across disciplines, blending combinations of visual, performing, and language arts with elements of activism, journalism, and social, cultural, and environmental themes. Works of social practice, Fletcher notes, are conscious of the context in which they are created, be it a grocery store, park, or school. They draw from the community, are participatory, and their frequently...
public exhibition democratizes the experience of engaging with art.

King School’s Principal Eryn Berg offers the following description of the neighborhood in which Fletcher’s students practice their craft. King is an Oregon Department of Education “Priority School” (one with high poverty rates and low student achievement), with roughly 400 students attending, about 90 percent of whom are African American or Hispanic. The King Neighborhood (bordered by NE Rodney, the Alberta Arts District, NE Ainsworth, and NE Fremont) has historically been non-white. Over the past decade, however, as gentrification has driven the cost of housing up as much as 133 percent, many minority families have left, in some locations nearly 50% according to data made available by the Coalition for a Livable Future’s Regional Equity Atlas.

King is also designated as a “Turnaround Arts” school. Turnaround Arts is a national, federal initiative providing services and resources to enhance arts education programming in high-poverty, low-performing schools across the country, driven by the belief that arts education is instrumental in addressing social inequities. In 2011, King was selected as one of eight schools in a pilot study assessing if and how the initiative narrows the achievement gap and improves student engagement. King students receive arts instruction and the arts are woven into all aspects of the school-day experience: music lessons resonate in mathematics classes, visual arts inform writing exercises, drama students enact historical events, and foreign language immersion programs reveal the world from other cultural points of view. Students now will also have the opportunity to participate in social practice and its inclusive approach to finding art and meaning in the world around us.

According to Fletcher and Berg, the partnership includes plans for PSU graduate students and middle school children at King to collaborate on works of art representative of the diversity, history, and culture of the neighborhood. The school will then construct museum-like displays with cases, placards, and banners designed by PSU students. At each step of the process children attending King will participate in learning activities ranging from the use of math in carpentry, to the composition of creative essays about the works on display in the school.

“The graduate students will work one-on-one with the kids from King,” Fletcher noted. “The King students will choose something representative of the neighborhood’s past or present. The PSU students will then create a work of art based on what was selected.”

“Together they’ll turn the school into a living museum,” said Berg. “King, which was once the Highland School, has a long history in the neighborhood. I’ve met people from all over Portland who went to school here. Some have children or even grandchildren who also attended. We want to share that history with the community and do so in a way that incorporates the arts and reflects the cultural heritage of the people who live and have lived here. We’re looking forward to seeing the participating middle school kids thinking about the neighborhood in relation to their own identity and working with the PSU cohort on a project that also gives something back to the community. We think this is going to be an excellent learning opportunity.”

Researchers cite mounting evidence that the arts not only support, but enhance curricula, improve child learning outcomes in reading, math, and other disciplines, and positively affect student behavior in and out of the classroom (Gullatt, 2008; President’s Committee on the Arts and the Humanities, 2013). Principal Berg noted that an arts-integrated curriculum is an important tool that can be used by educators to increase equity and promote social justice for students of color and students living in poverty.

As Fletcher explains further, “I think part of what social practice does is show us that interesting, significant occurrences are happening all the time. By creating these works in places like schools, artists are cultivating in the population a great appreciation for society and culture and providing examples of how to interact with them in new and exciting ways.”

For more information about the Art and Social Practice MFA and King School partnership, and to learn about social practice in general and view works by Fletcher’s past and current students, visit the program’s homepage at www.psusocialpractice.org.


By Shaun McGillis
PSU’s $1.4 Billion Urban Footprint

When I first arrived at Portland State University six years ago, I immediately recognized three primary strengths: A solid partnership with the city and region; a go-to resource for economic development and employers; and a deep commitment to sustainability. Since then, I have made it PSU’s mission to enhance and expand on those strengths.

Now it’s time to take stock. How have we done? What kind of impact have we had on the urban region we serve? Are we making the kind of progress I promised?

A new report from our Office of Strategic Partnerships on PSU’s role in economic development in the Portland region puts numbers to the programs and fleshes out the initiatives and partnerships we have undertaken. Highlights include:

- $150 million in private venture capital and government grants generated by PSU’s Business Accelerator.
- 650 companies supported by our Business Outreach Program.
- 92 percent of New Seasons waste diverted or recycled instead of landfilled after help from PSU’s Community and Environmental Services.
- PSU has 33 issued patents; six start-up companies based on PSU intellectual property; 62 active intellectual property license agreements; and 71 active intellectual property projects.

Also read about GlobeSherpa, the hard-charging tech company that grew out of a student project and now makes ticketless apps for a number of urban transit systems. Or about how PSU’s faculty have reached out to industry to align programs and degrees to meet the needs of a changing workforce. PSU even helped a Portland cupcake baker rebrand and grow his food cart business.

As Portland and its neighbors ponder the region’s economic future, and as the Oregon Legislature gathers in Salem to move the state forward, this report is a timely assessment -- and reminder -- of how Portland State’s faculty, staff and students are making a difference.

Please give it a read and tell me what you think.

Wim Wiewel
@PresidentWiewel

Keck Foundation Gives $300K For Architecture Lab

Architecture students at Portland State University will conduct research on the latest green building techniques in a new design lab starting next fall, thanks to a $300,000 grant from the W.M. Keck Foundation.

The grant will help expand the School of Architecture’s Research-based Design Initiative by providing more research opportunities for undergraduate students, including computer simulation of designs and analysis of building performance.

“Our goal is to reduce the environmental impact of the built environment,” said Assistant Professor Corey Griffin, who wrote the grant proposal. “This new lab will help teach students about research techniques and how buildings use energy with hands-on projects, even in large introductory lecture courses.”

Griffin and Professor Sergio Palleroni launched the Research-based Design Initiative in 2011 to transform graduate-level building science classes with practice-based research projects. Grants from the National Council of Architectural Registration Boards (NCARB) and the Oregon Community Foundation enabled graduate students to work with five local architecture firms on real-world building projects. For instance, architecture students have worked with Boora Architects to analyze day-lighting strategies in a new school and used thermal imaging cameras to measure heat loss in PSU’s School of Business Administration for SRG Partnership.

The Keck grant for undergraduate education complements a $630,000 award for undergraduate and graduate scholarships to encourage the study of building science that Griffin received from the NSF in 2014.

The Keck grant will help create a new undergraduate research lab with computers, sensors, design-simulation software and fabrication tools for rapid prototypes. It will also create three fellowships per year for three years for faculty members to develop lessons in the lab for their classes.

Clive Knights, director of the School of Architecture, said: “In a school that has built its educational goals around the human experience of architecture, the Keck award affords our students the opportunity to learn through direct, hands-on empirical investigation of buildings and to test prototypes for sustainable solutions that would otherwise remain purely conceptual.”

By Suzanne Pardington
University Communications
Researchers Uncover High Levels of Formaldehyde in E-cigarette Vapor

By Chelsea Bailey
College of Liberal Arts and Sciences

In a study published in the New England Journal of Medicine, Portland State University researchers reveal that e-cigarette vapor can contain “hidden” formaldehyde at levels five to 15 times higher than regular cigarettes.

Researchers have long known that formaldehyde and other toxic chemicals are present in cigarette smoke, and initially, e-cigarettes were hoped to be without such dangers because they lack fire to cause combustion and release the chemicals. But now, many e-cigarettes can substantially increase the heat they produce.

“The popular ‘tank system’ e-cigarettes allow users to really turn up the heat and deliver high amounts of vapor, or e-cigarette smoke,” said David H. Peyton, PSU chemistry professor and lead researcher.

“Our research shows that when heated at higher temperatures, e-cigarette juices can vaporize and form large amounts of ‘hidden formaldehyde,’ five to 15 times higher than the amount of formaldehyde in traditional cigarettes.”

Formaldehyde is a known human carcinogen. It is a colorless, strong-smelling gas, commonly used as an adhesive in building materials such as particle board and in mortuaries as an embalming fluid. Formaldehyde is also used as an industrial fungicide, germicide and disinfectant.

E-cigarette devices and their liquids are not regulated by the Food and Drug Administration (FDA). A lack of regulation means that companies are not required to disclose their manufacturing process, their ingredient list or any scientific data to the FDA.

“E-cigarettes are becoming more complicated and more like real cigarettes by the day,” said PSU Professor and National Academy of Engineering member James F. Pankow, who is an expert on the chemistry of tobacco smoke particles. “They use extremely high temperatures to vaporize their fluids and contain high levels of chemical additives. Some include materials derived from tobacco, and that’s in addition to the nicotine. No one should assume e-cigarettes are safe. For conventional cigarettes, once people become addicted, it takes numerous years of smoking to result in a high risk of lung cancer and other severe disease; it will probably take five to 10 years to start to see whether e-cigarettes are truly as safe as some people believe them to be.”

In April 2014, the FDA proposed federal restrictions that would bring e-cigarettes under the same regulation as tobacco, outlined in the 2009 Family Smoking Prevention and Tobacco Control Act. The proposed federal restrictions are still under review and no schedule has been set for adoption.

“Our overarching concern about e-cigarette use is the lack of research on health risks,” said Jackilen Shannon, a cancer prevention expert with the Knight Cancer Institute at Oregon Health & Science University. “This study represents progress toward providing some much-needed data on the make-up of the smoke from some e-cigarettes.”

Peyton and his colleagues agree that more research must be done to evaluate the health risks of e-cigarettes.

“E-cigarettes present their own unique chemical properties, and now that we have methods that can detect this hidden formaldehyde, we can look for other toxins that might be posing a risk to e-cigarette users,” said Robert Strongin, a PSU chemistry professor, who also contributed to the study.

Peyton is chief scientific officer/co-founder of DesignMedix, Inc., a Portland-based and PSU-derived drug discovery and drug development company in Portland, which focuses on therapies for infectious diseases. He is author of more than 60 peer-reviewed publications, which range from medicinal chemistry, to biochemistry, to the chemistry of tobacco smoke particles.

Pankow is the author of more than 150 peer-reviewed publications and four books. He received the 2005 Haagen-Smit Prize for his groundbreaking research on the formation of particles in the atmosphere; particles play a fundamental role in controlling the delivery of nicotine and carcinogens from cigarette smoke. He has a dual appointment in the PSU Department of Civil and Environmental Engineering and in the PSU Department of Chemistry.

Strongin is a professor in the PSU Department of Chemistry. His peer-reviewed publications have been cited over 5,000 times. He is an expert in the molecular basis of oxidative stress, disease diagnostics and drug design.

Additional contributors to the study included R. Paul Jensen, B.S. and Wentai Luo, Ph.D.

More information is available at the New England Journal of Medicine.
The Northwest Economic Research Center (NERC) at Portland State University recently reported the results of an eight-month study commissioned by the Oregon Legislature that finds a statewide carbon tax policy that redirects tax revenue back to the Oregon economy would have little to no impact on employment and economic output.

The study modeled a range of policy options. Among its findings is that a pricing rate of $60 per ton of carbon emissions would raise more than $2.3 billion in revenue for Oregon and have a significant impact on emissions reductions by reducing overall demand and creating incentives for behavioral change. Even at a lower rate of $30 per ton of carbon emissions, Oregon emissions would fall significantly below 1990 levels—allowing the state to reach its ambitious emissions reduction goals by 2020. An analysis of 70 specific industries found only minimal impacts resulting from such a carbon pricing policy, which could be offset through other tax reductions. Similarly, effects on household income would be small, with varying options to offset impacts through existing tax and public assistance programs.

The study, commissioned by the Legislature during the 2013 session through Senate Bill 306, is the most thorough analysis of a state-level carbon tax in the U.S. and includes detailed data about potential impacts and benefits of carbon pricing on specific regions and industries throughout Oregon. NERC worked with two PSU physicists, Andrew Rice and Christopher Butenhoff, to develop a finely tuned emissions model to accurately portray the benefits to Oregon resulting from reduced carbon emissions.

“This report is the result of a much deeper dive on this concept of a carbon tax and revenue repatriation and expenditure for Oregon,” said Tom Potiowsky, director of NERC and chair of PSU’s Department of Economics. “What we’ve continued to show is that putting a price on carbon will definitely reduce emissions and that a carefully crafted policy can achieve those reductions while ensuring that the economic impacts are minimal, or even slightly positive. Oregon could create a powerful incentive for behavior change and becoming a leading economic force for developing solutions for a low-carbon world.”

NERC’s research follows and improves upon its March 2013 report, “Carbon Tax and Shift: How to Make It Work for Oregon’s Economy.” That report, funded by the Energy Foundation and Portland State University’s Institute for Sustainable Solutions, was the first to highlight the potential revenue and emissions reductions benefits of a carbon tax for Oregon and became a model for many other states exploring carbon pricing policy.

Under the leadership of Potiowsky and with the expertise of NERC’s Assistant Director Jenny Liu, an environmental and transportation economist, and assistant professor of Urban Studies and Planning, and Senior Economist Jeff Renfro, NERC has emerged as a leading center of research on the economics of carbon pricing.

The full report to the Oregon Legislative Revenue Office is available on the NERC website: www.pdx.edu/nerc/projects.
Awards by Quarter

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Selected Awards

Baney, William, *MESD Project LAUNCH Workforce Development*, SSW, Substance Abuse and Mental Health Services Administration, $63,588, New


Becker, William, *Expansion of K-6 NGSS Instructional Specialist Program*, CLAS, Oregon Department of Education, $316,422, New

Bluehorse Skelton, Judy, *Sense of Place: Engaging Indigenous Peoples*, CLAS, Metro, $20,600, New

Cahn, Katharine, *Knowing Who You Are*, SSW, $80,000, New

Clark, Michael; Smyth, John, *Religion, Secularism, and Political Belonging (RelSec)*, CLAS, Andrew W. Mellon Foundation, $17,389, Amendment

Crespo, Carlos; Keller, Tom; Estes, Suzanne; Richardson, Dawn; Strongin, Robert; Becker, William; Fallon, Ann Marie; Labisseriere, Yves; *Enhancing Cross Disciplinary Infrastructure and Training at Oregon (EXITO) Research Enrichment Core*, CLAS, CUPA, SSW, Honors, $24,000,000, National Institutes of Health, New

Curry-Stevens, Ann, *Survey and Interview Study of Minority Licensed Educators*, SSW, Oregon Education Investment Board, $4,000, New

Damon, Lara, *Microenterprise and Small Business Development Program*, SBA, U.S. Housing and Urban Development Department, $207,000, New


Faaleava, Toeutu, *Ronald E. McNair Post baccalaureate Achievement Program*, OAA, U.S. Department of Education, $231,000, Amendment

Fink, Jonathan, *Information Technology Research Collaboratory*, RSP, Oregon Business Development Department, $2,294,000, New

Selected Awards

Gelmon, Sherril, Phase Three Evaluation of PCPCH Implementation, CUPA, Oregon Health Policy and Research, $398,471, Amendment
George, Linda; Parra, Jeremy, Calibration of Canary Board Sensors, CLAS, Intel Corporation, $49,766, New
Gil-Kashiwabara, Eleanor; Rockhill, Anna, Maternal, Infant, and Early Childhood Home Yves Labisseriere Visiting (MIECHV) Expansion Project Evaluation, SSW, Oregon Health Authority, $780,000, New
Gordon, Sean, Watershed Assessment Model Development for the Interagency AREMP, ISS, Bureau of Land Management, $75,433, Amendment
Green, Beth, The Early Learning Kindergarten Readiness Partnership & Innovation Grant Evaluation, SSW, Oregon Department of Education, $106,915, New
Hammer, Leslie, Oregon Healthy Work Life Center (Years 4 & 5), CLAS, Centers for Disease Control and Prevention, $240,124, New
Harris, Kathryn, Improving Adult English Language Instruction, SSW, U.S. Department of Education, $61,712, Amendment
Heying, Charles; Schrock, Greg, Maker-enabling Entrepreneurs in Metropolitan Manufacturing Economies, CUPA, Kauffman Foundation, $70,858, New
Ingle, Marcus, Vietnam Partnership for 20th Anniversary Normalization Events, CUPA, U.S. Department of State, $500,000, New
Iwata-Revuy, Dirk, RNA Modification: Structure and Function, CLAS, National Institutes of Health, $143,731, New
Jay, David; Talke, Stefan, Historical Tidal Data Recovery and Analysis, MCECS, U.S. Army Corps of Engineers, $242,676, New
Jiao, Jun, Fabrication of High-quality Large-Area Graphene for the Development of All-Carbon Interconnects, MCECS, Oregon Nanoscience and Microtechnologies Institute, $9,800, New
Jivanjee, Pauline, Behavioral Health Workforce Education and Training for Professionals and Paraprofessionals, SSW, Health Resources and Services Administration, $480,000, New
Kagan, James; Burcsu, Theresa, All Lands All Threats Plan and Implementation for Sage Grouse, CLAS, Oregon Watershed Enhancement Board, $69,654, New
Kelly, Jane, Novel Broad-Spectrum Antimalariais, CLAS, National Institutes of Health, $28,302, Amendment
Kelly, Maura, ODOT Disparity Study, CLAS, Oregon Department of Transportation, $50,000, New
Luiz, Jessamyn, Oregon Volunteers, EMSA, Corporation for National and Community Service, $175,645, Amendment
Mashburn, Andrew, Efficacy of the WINGS After-School Social and Emotional Learning Program, CLAS, U.S. Department of Education, $97,689 Amendment
Messer, Lynne, Guide to Healing, CUPA, Health Resources and Services Administration, $27,621, Amendment
Miller, Thaddeus, Community Watershed Stewardship, CUPA, City of Portland, $5,139, Amendment
Monsere, Christopher, Risk Factors for Pedestrian and Bicycle Crashes, MCECS, Oregon Department of Transportation, $82,594, New
Mohr, Cynthia, APA Dissertation Research Award: Sarah Arpin, CLAS, American Psychological Association, $1,000, New
Neal, Margaret; DeLa Torre, Alan, PSU Bridge Meadows Program Evaluation, CUPA, Bridge Meadows, $50,000, New
Orellana, E. Roberto, Crossing Borders: HIV and Substance Abuse at the Gateway to North America, SSW, National Institutes of Health, $90,210, Amendment
Nicolaids, Christine; Oschwald, Mary; Powers, Laurie, Pregnancy and Support Services for Women with Developmental Disabilities, SSW, National Institutes of Health, $233,886, New
Rad, Farrokh, Seismic Assessments of a Set of State-Owned Buildings, MCECS, Oregon Department of Administrative Services, $59,146, New
Rynerson, Charles, Enrollment Forecasts for 2015-2016 to 2030-2031, CUPA, Portland Public Schools, $101,400, New
Scheller, Robert, Projecting Climate Change Effects on Aspen Distribution and Productivity in the Northern Rockies by Coupling Hydrological and Landscape-disturbance Models, CLAS, U.S. Geological Survey, $43,253, New
Siderius, T. Martin, Low-Cost Bottom Composition and Roughness Sensor, MCECS, Office of Naval Research, $63,600, New
Strecker, Angela; Sysma, Mark; Berger, Chris; Wells, Scott, TIP 320 Modeling Mussels: Development of CE-QUAL-W2 Subcomponent, CLAS, Bonneville Power Administration, $221,927, New
Thanheiser, Eva; Noll, Jennifer, Enhancing Mathematics Teaching and Learning in Urban Elementary Schools, CLAS, National Science Foundation, $111,383, Amendment
Trinidad, Alma, Dreamer Project Evaluation Services, SSW, I Have a Dream Foundation, $42,396, New
Tufte, Kristin, PORTAL Maintenance and Enhancements, TREC, Federal Highway Administration, $125,000, New
Walker, Janet, Research and Training Center for Pathways to Positive Futures: Building Self-Determination and Community Living and Participation, SSW, U.S. Department of Education, $499,600, New
Wallace, Neal, Phase Three Evaluation of PCPCH Implementation, CUPA, Oregon Health Policy and Research, $398,471, Amendment
Weislogel, Mark, Geometry-Driven Capillary Flow, MCECS, National Aeronautics and Space Administration, $35,000, Amendment
White, Diana, Aging and Disability Resource Connection Centers (ADRC) Mental Health Funding, CUPA, Oregon Department of Human Services, $215,694, New
Zaron, Edward, Data Assimilation and Inverse Modeling in Rivers, Estuaries, and the Coastal Ocean, MCECS, National Geospatial-Intelligence Agency, $13,314, New

View the complete list of awards at: pdx.edu/research/awards-fy15-q2
Research Snapshot  
Second Quarter, Fiscal Year 2015

Proposals by Quarter

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Proposals Submitted Q2

- **CLAS**: 62
- **COTA**: 18
- **SSW**: 21
- **RSP, OAA, OTHER**: 8
- **MCECS**: 24
- **GSE**: 5

Selected Proposals

View the complete list of proposals at:
pdx.edu/research/proposals-fy15-q2


Amali, Said, SSW, *Digital Preservation of At-Risk Middle East’s Historical Manuscripts*, Qatar National Research Fund, $171,650

Anderson, Shelby, CLAS, *Collaborative Research: People, Landscape & Narrative in Time - Birmirk and Later Cultural Development in Northern Seward Peninsula*, National Science Foundation, $200,000

Baney, William, SSW, *Oregon’s Maternal, Infant, and Early Childhood Home Visiting Project (MIECHV)*, Oregon Health Authority, $140,766

Bank, Lewis; Donlan, William; Lee, Junghie; Yang, Liu-Qin, SSW, *Strong and Healthy Immigrant Children (SHIC) and Families*, National Institutes of Health, $2,714,209

Barsanti, Kelley; Clifton, Kelly, MCECS, *Empowering Communities with Air Quality Information: Development and Application of Low-Cost Air Pollution Samplers, Data Products, and Shared Knowledge*, Environmental Protection Agency, $749,979

Bass, Robert, MCECS, PGE/PSU Smart Power Research Initiative, Portland General Electric, $124,755

Bass, Robert; Bauer, Talya; Erdogen, Berrin; McNames, James; Pejinovic, Branimir; Teuscher, Christof, MCECS, *IUSE/PFE:RED: Student Success through Faculty Transformation at Urban Universities*, National Science Foundation, $1,799,884


Becker, William, CLAS, *Expansion of K-6 NGSS Instructional Specialist Program*, Oregon Department of Education, $1,199,023

Botsford, Kathryn; Lawson, Holly, GSE, *Vision Professionals for Under Served Areas (VIPs-USA)*, U.S. Department of Education, $1,248,872

Brown, Julie; Falco, Ruth; Loman, Sheldon, GSE, *Diverse Special Educators (DiSE)*, U.S. Department of Education, $1,249,569

Brown, Kim, CLAS, *Population and Disease Associated Sequences from Unmappable 1,000 Genomes Reads*, National Institutes of Health, $408,375

Cahn, Katharine, SSW, *Knowing Who You Are*, Casey Family Programs, $80,000

Looking for funding? Find opportunities at: pdx.edu/research/funding-opportunities
Cal Santiago, Raul B, MCECS, Collaborative Research: Coherent Structure Identification on Thermal Turbulent Boundary Layers Under Severe External Conditions, National Science Foundation, $261,275

Chaille, Christine; Laurence, Wendi, GSE, Exploration is Primary: Virtual Innovation Collaboratives to Support PK-3 Teacher Engagement in the Scholarship of STEM Teaching Learning and Assessment, National Science Foundation, $2,922,267

Courcelle, Justin, CLAS, The Completion of DNA Replication, National Science Foundation, $779,413

DeAnda, Roberto; La Rosa, Andres, CLAS, Education Research, Social Science, and Hands-on Training Latino Students for Opto/Acoustic Nanotechnologies, National Science Foundation, $247,768

DeRivera, Catherine; Ruiz, Greg, CLAS, RAPID: A Rare Opportunity to Examine the Hydra Effect Resulting from Intensive Harvest of an Introduced Predator, National Science Foundation, $71,416

Dresner, Marion; Gerwing, Jeffery; Lafrenz, Martin; Lubitow, Amy; Murphy, Michael, CLAS, Collaborative Research. Natives in the Neighborhood, National Science Foundation, $1,951,074

Elliott, Debra, RRI, Oregon Gambling Prevalence Study Phone Survey, Oregon Council on Problem Gambling, $110,770

Etnier, Michael, CLAS, Collaborative Research: Archaeological and Paleoenvironmental Perspectives of Climate Change in the Aleutian Islands, National Science Foundation, $134,310


George, Linda; Weasel, Lisa, CLAS, Assessing Deliberative Pedagogy to Advance Student Engagement and Center Pathways in Environmental Science, National Science Foundation, $249,940

Granek, Elise; Sandas, Vivek, CLAS, International Comparisons of Ecosystem Services in Rapidly Urbanizing Regions: Internationalizing Portland State University’s IGERT program, National Science Foundation, $99,533

Hammer, Leslie, CLAS, Graduate Training in Occupational Health Psychology, Centers for Disease Control and Prevention, $618,791

Henning, Kris; Kahn, Kimberly; Labissiere, Youes; Renauer, Brian, CUPA, Portland Neighborhood Involvement Locations Evaluation, City of Portland, $296,000

Hook, James; Roncken, Marly, MCECS, Collaborative Research: Expedition in Self-Timed Systems, National Science Foundation, $1,873,010

Jiao, Jun, MCECS, SusChem: Collaborative Research—Granular Activated Carbon Supported Bimetal Catalysts for Sustainable Water Treatment, National Science Foundation, $273,011

Johannson, Erik, CLAS, Evaluating the Photovoltage-potential of PbS Quantum Dot Solids, National Science Foundation, $326,156

Key-DeLyria, Sarah, CLAS, Statistical Learning of Artificial and Natural Language in Aphasia, National Institutes of Health, $428,747

Lawson, Holly; Teuscher, Christof; Sennott, Samuel, GSE, Unified English Braille through a Powerful and Responsive eLearning Platform, (UBE PREP), U.S. Department of Education, $548,483

Lucash, Melissa; Nielsen-Pincus, Max; Scheller, Robert, CLAS, CNH-L: Visualizing Forest Futures: how Biodiversity and Human Values Shape Decision-making Under Climate Change, National Science Foundation, $160,151

Mackiewicz, Marilyn, CLAS, Hybrid Model Membranes Probes for Use in Screening Assays of Small Molecules for Alzheimer’s Disease, National Institutes of Health, $1,426,875

Morse, Jennifer, CLAS, Terrestrial Denitrification and Global Environmental Change, Department of Energy, $402,503

Nissen, Laura, SSW, SBIRT Training Program, Substance Abuse and Mental Health Services Administration, $171,582

Ovall, Jeffrey, CLAS, Cluster-robust Estimates for Galerkin and Petrov-Galerkin Discretizations of Elliptic Eigenvalue Problems, National Science Foundation, $212,591

Pankow, James, MCECS, Source Identification/Reduction - Nonyl Phenols (NPs), NP Precursors, & Triclosan in Waste Water Treatment Systems: Chemical Analyses, System Analyses, and Transformative Outreach, National Science Foundation, $330,000

Perona, John, CLAS, Sulfur Tracking in Methanogens, National Science Foundation, $939,923

Raghavan, Rahul, CLAS, Horizontally Acquired tRNA Enhances Coxiiella burnetii Infection of Macrophages, National Institutes of Health, $431,912

Sailor, David, MCECS, Collaborative Research: Development of a Multi-scale Model to Determine Optimal Urban Heat Mitigation Strategies for Vulnerable Populations in a Changing Climate, National Science Foundation, $141,149

Singer, Jeffrey, CLAS, Collaborative Research: Cul3/Klhdc5 E3 Ligase Regulation of P60/Katanin in Mitosis and Neurogenesis, National Science Foundation, $599,840

St. Lawrence, Janet, CLAS, Improving Reproductive Health of Botswana Youth and Families, National Institutes of Health, $2,712,229

Straton, Jack, CLAS, Production of the Positive Antihydrogen Ion via Stimulated Radiative Attachment, National Science Foundation, $229,713

Teuscher, Christof, MCECS, AF: Large: Collaborative Research: Molecular Computing for the Real World, National Science Foundation, $398,465

Vassilevski, Panayot, CLAS, Multilevel Methods for Discrete Problems on Graphs Arising in Large-scale Data-enabled Simulations, National Science Foundation, $471,528

Walker, Janet, SSW, PSU National Wraparound Implementation Center (NWIC) with Indiana, Substance Abuse and Mental Health Services Administration, $19,344

Wan, Eric, MCECS, 4D Quantification of Regional Myocardial Perfusion and Function, National Institutes of Health, $95,391
Expenditures by Quarter

<table>
<thead>
<tr>
<th>Quarter</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
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<td>Q4</td>
<td>$16,514,334</td>
<td>$15,247,118</td>
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<td>Q3</td>
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<td>Q2</td>
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</table>

Research Expenditures Q2, 2015

![Pie chart showing funding sources]

Q2 Publications

This partial list of publications contains articles by PSU faculty published between Oct. 1, 2014 and Dec. 31, 2014. 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. If you published a paper between October and December that does not appear in the Quarterly Review or the full list posted online, email publication information in APA format to rspcom@pdx.edu.


Ki Yung Ahn, Ph.D.
Dissertation Chair: Tim Sheard, MCECS
Dissertation title: The Nax Language: Unifying Functional Programming and Logical Reasoning in a Language based on Mendler-style Recursion Schemes and Term-indexed Types

Ingrid Mari Anderson, Ed.D.
Dissertation Chair: William Parnell, GSE
Dissertation title: Early Childhood Educators’ Perception of Oregon’s Professional Development System: A Hermeneutic Phenomenological Study

Alexander York Bigazzi, Ph.D.
Dissertation Chair: Miguel Figliozzi, MCECS
Dissertation title: Bicyclists’ Uptake of Traffic-Related Air Pollution: Effects of the Urban Transportation System

Christopher S. Blanchard, Ph.D.
Dissertation Chair: Carl Abbott, CUPA
Dissertation title: Changing the Face of the Earth: The Morrison-Knudsen Corporation as Partner to the U.S. Federal Government

Carol L. Campbell, Ed.D.
Dissertation Chair: Thomas Chenoweth, GSE
Dissertation title: Teachers Teaching Teachers: A Sustainable and Inexpensive Professional Development Program to Improve Instruction

Mildred Ann Davis, Ph.D.
Dissertation Chair: Barbara Friesen, SSW
Dissertation title: Understanding Sexual Assault Survivors’ Willingness to Participate in the Judicial System

Justin Charles Dunlap, Ph.D.
Dissertation Chair: Erik Bodegom, CLAS
Dissertation title: Characterization and Modeling of Nonlinear Dark Current in Digital Imagers

Rodolfo Fernandez Rodriguez, Ph.D.
Dissertation Chair: Andres La Rosa, CLAS
Dissertation title: Confined Mesoscopic Fluid-like Films Analyzed with Frequency Modulation and Acoustic Detection

Lovemore Hakuna, Ph.D.
Dissertation Chair: Robert Strongin, CLAS
Dissertation title: Selective Indicators for Optical Determination of Disease Biomarkers

Daniel Keith Huld, Ed.D.
Dissertation Chair: Thomas Chenoweth, GSE
Dissertation title: From the Whiteboard to the Web: Equipping Administrators to Recruit, Hire, and Induct Top Quality K-12 Online Teachers

Patrick Michael Leyshock, Ph.D.
Dissertation Chair: David Maier, MCECS
Dissertation title: Optimizing Data Movement in Hybrid Analytic Systems

Katherine May Liebman, Ph.D.
Dissertation Chair: David Peyton, CLAS
Dissertation title: New 4-Aminoquinoline Compounds to Reverse Drug Resistance in P. falciparum Malaria, and a Survey of Early European Antimalarial Treatments

Liang Ma, Ph.D.
Dissertation Chair: Jennifer Dill, CUPA
Dissertation title: The Objective vs. the Perceived Environment: What Matters for Active Travel

Meghan S. Martin, Ph.D.
Dissertation Chair: Deborah Duffield, CLAS
Dissertation title: The Role of Mate Preference and Personality on Reproductive Performance in an Ex-Situ Conservation Breeding Program for the Giant Panda (Ailuropoda melanoleuca)

Laura Jean Owen, Ph.D.
Dissertation Chair: Jonathan Abramson, CLAS
Dissertation title: Modulation of the Cardiac Calcium Release Channel by Homocysteine Thiolactone

A. Del Quest, Ph.D.
Dissertation Chair: Ben Anderson-Nathe, SSW
Dissertation title: Out of the Way and Out of Place: An Interpretative Phenomenological Analysis of the Experiences of Social Interactions of Bisexually Attracted Young People

Renu Singh, Ph.D.
Dissertation Chair: Kevin Reynolds, CLAS
Dissertation title: Enzymatic Control of the Related Pathways of Fatty Acid and Undecylprodiginine Biosynthesis in Streptomyces coelicolor

Nicole Van Gasse, Ed.D.
Dissertation Chair: Christine Chaille, GSE
Dissertation title: An Exploratory Study of Teachers’ Uses of Data to Understand Students’ Cognitive and Affective Engagement

Barbara Ann Whitbeck, Ph.D.
Dissertation Chair: Maria Talbott, SSW
Dissertation title: Strengths in Action: Implementing a Learning Organization Model in a Human Service Setting

Gerald Young, Ed.D.
Dissertation Chair: Ronald Narode, GSE
Dissertation title: The Journey to Becoming Constructivist, Presidential Award for Excellence in Mathematics and Science Teaching, Secondary Mathematics Teacher