

## **APPENDIX A**

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### **WSU 2014-19 STRATEGIC PLAN**

# Strategic Plan 2014-2019

President Elson S. Floyd, Ph.D.



WASHINGTON STATE  
UNIVERSITY



## Introduction

The 2014-19 strategic plan builds on the previous five-year plan, recognizing the core values and broad mission of Washington State University. Goals and strategies were developed to achieve significant progress toward WSU's aspiration of becoming one of the nation's leading land-grant universities, preeminent in research and discovery, teaching, and engagement. The plan emphasizes the institution's unique role as an accessible, approachable research institution that provides opportunities to an especially broad array of students while serving Washington state's broad portfolio of social and economic needs. While providing exceptional leadership in traditional land-grant disciplines, Washington State University adds value as an integrative partner for problem solving due to its innovative focus on applications and its breadth of program excellence. The plan explicitly recognizes the dramatic changes in public funding that have occurred over the duration of the previous strategic plan, along with the need for greater institutional nimbleness, openness, and entrepreneurial activity that diversifies the University's funding portfolio. In addition, the plan reaffirms WSU's land-grant mission by focusing greater attention system-wide on increasing access to educational opportunity, responding to the needs of Washington state through research, instruction, and outreach, and contributing to economic development and public policy.

While the new plan retains the four key themes of the previous plan, its two central foci include offering a truly transformative educational experience to undergraduate and graduate students and accelerating the development of a preeminent research portfolio. Campuses, colleges, and other units will develop their own strategic plans that align with this plan and will make decisions and investments according to structures, principles, and processes set forth herein.

Washington State University's long-standing commitment to provide students with a transformational experience will continue with a focus on enhancing the quality and relevance of the learning experience, providing more personalized student services, expanding learning opportunities outside the classroom, and developing a more cohesive student community. The undergraduate experience will build upon WSU's nationally recognized writing, general education, and undergraduate research programs. Support for a transformational graduate experience will emphasize opportunities to engage in mentored research and outreach. Changes in the student experience will include increases in the size and diversity of the undergraduate student body. Enrollment growth will occur as a result of increased freshman and transfer admissions, as well as significant improvements in student retention.

Continued pursuit of a preeminent research portfolio will occur as a result of strategic investment in research infrastructure, increased faculty research effort, and continued emphasis on WSU's research strengths. In addition, the University will build out emerging areas of research excellence and interdisciplinary collaboration while emphasizing its unique responsibility to address the particular needs of Washington state. WSU's research portfolio will be characterized by continued growth of research expenditures, expansion in scholarly outputs, enhancement in the development of intellectual property, and growth in graduate student enrollment, particularly doctoral students. Our progress will be measured by and against the research productivity of outstanding American universities, and most notably against members of the Association of American Universities (AAU) member institutions. This profile requires a broad portfolio of excellence that spans science, technology, engineering, math, humanities, and social sciences.



## ➤ Vision

Washington State University will be one of the nation's leading land-grant universities, preeminent in research and discovery, teaching, and engagement.

## ➤ Mission

Washington State University is a public research university committed to its land-grant heritage and tradition of service to society. Our mission is threefold:

- To **advance** knowledge through creative research, innovation, and creativity across a wide range of academic disciplines.
- To **extend** knowledge through innovative educational programs in which students and emerging scholars are mentored to realize their highest potential and assume roles of leadership, responsibility, and service to society.
- To **apply** knowledge through local and global engagement that will improve quality of life and enhance the economy of the state, nation, and world.

## ➤ Values

- **Quality and Excellence:** We are committed to providing quality and excellence in all our endeavors.
- **Integrity, Trust, and Respect:** We are committed to ensuring trust and respect for all persons in an environment that cultivates individual and institutional integrity in all that we do.
- **Research, Innovation, and Creativity:** We are committed to the pursuit of inquiry and discovery and to the creation and dissemination of knowledge.
- **Land-Grant Ideals:** We are committed to the land-grant ideals of access, engagement, leadership, and service to bring the practical benefits of education to the state, nation, and global community.
- **Diversity and Global Citizenship:** We embrace a worldview that recognizes and values the importance of domestic and global diversity, global interdependence, and sustainability.
- **Freedom of Expression:** We are committed to the free exchange of ideas in a constructive and civil environment, including the canons of academic freedom in research, teaching, and outreach.
- **Stewardship and Accountability:** We are committed to serving as ethical and responsible stewards of University resources.



## ➤ Theme 1: Exceptional Research, Innovation, and Creativity

- Goal 1:** Increase productivity in research, innovation, and creativity to address the grand challenges and opportunities of the future.
- Goal 2:** Further develop WSU's unique strengths and opportunities for research, innovation, and creativity based on its locations and land-grant mandate to be responsive to the needs of Washington state.
- Goal 3:** Advance WSU's reach both nationally and internationally in existing and emerging areas of achievement.

### ➔ Theme 1 Sub-goals

- 1.a. Grow and diversify extramural research funding.
- 1.b. Attract, retain, and develop high-quality research faculty members system-wide.
- 1.c. Develop and sustain the physical and technological infrastructure, resources, and expertise to support increased research and scholarly productivity system-wide, with particular emphasis on core laboratories and academic computing.
- 1.d. Build upon WSU's current and emerging areas of research excellence and international reputation.
- 1.e. Increase engagement and productivity of graduate students, postdoctoral associates, and undergraduates in mentored research, innovative projects, and creative endeavors.

## ➤ Theme 2: Transformative Student Experience

- Goal 1:** Provide an excellent teaching and learning opportunity to a larger and more diverse student population.
- Goal 2:** Provide a university experience centered on student engagement, development, and success, which prepares graduates to lead and excel in a diverse United States and global society.
- Goal 3:** Improve curricular and student support infrastructure to enhance access, educational quality, and student success in a growing institution.

### ➔ Theme 2 Sub-goals

- 2.a. Enhance student engagement and achievement in academics and cocurricular activities.
- 2.b. Increase the size, diversity, and academic preparedness of the undergraduate and graduate student populations in Pullman and at the urban campuses.
- 2.c. Produce graduates who are highly sought by post-baccalaureate and post-graduate employers and graduate/professional programs.
- 2.d. Align student recruitment, admissions, and retention system-wide to enhance access, inclusiveness, and student success.



## ➤ Theme 3: Outreach and Engagement

- Goal 1:** Increase access to and breadth of WSU's research, scholarship, creative, academic, and extension programs throughout Washington and the world.
- Goal 2:** Expand and enhance WSU's engagement with institutions, communities, governments, and the private sector.
- Goal 3:** Increase WSU faculty, staff, and students' contributions to economic vitality, educational outcomes, and quality of life at the local, state, and international levels.

### ➔ Theme 3 Sub-goals

- 3.a. Increase the impact of WSU research, scholarship, creative, and outreach activities on quality of life and economic development within the state and region.
- 3.b. Increase access to the WSU system for place-bound, non-traditional, first-generation, and other underserved and underrepresented students.
- 3.c. Contribute to economic security, stability, social justice, and public policy through research, education, the arts, extension, and citizen-based and public policy engagement.
- 3.d. Increase WSU's global presence and impact worldwide.
- 3.e. Improve WSU's reputation with external constituencies.

## ➤ Theme 4: Institutional Effectiveness: Diversity, Integrity, and Openness

- Goal 1:** Create and sustain a university community that is diverse, inclusive, and equitable.
- Goal 2:** Cultivate a system-wide culture of organizational integrity, effectiveness, and openness that facilitates pursuit of the institution's academic aspirations.
- Goal 3:** Steward and diversify resources invested by students, the public, and private stakeholders in a responsible way to ensure economic viability of the institution.

### ➔ Theme 4 Sub-goals

- 4.a. Recruit, retain, and advance a diverse intellectual mix of faculty, staff, and students, including women and those from underrepresented groups.
- 4.b. Maintain respectful, inclusive, and equitable behavior in all university environments.
- 4.c. Increase employee productivity and satisfaction.
- 4.d. Strengthen administrative accountability, innovation, creativity, openness, transparency, and collaboration to advance the University's mission.
- 4.e. Utilize institutional strategic plans, valid and reliable data, and evaluation indicators to align investments of resources with institutional priorities.
- 4.f. Expand, diversify, and effectively steward funding to advance the University's mission.



## ➤ Appendix

### 2014-19 Strategic Plan Performance Indicators

#### ➔ Introduction

The strategic plan includes an implementation plan and the establishment of an implementation committee to ensure that initiatives are developed and executed to realize the plan’s goals. Quantitative metrics (benchmarks) identified for each sub-goal, located in column 3 of the tables, will be calculated on an annual basis. The implementation committee will work with the Office of the Provost to define quantitative targets and annual rates of progress (milestones) for these benchmarks. Other evidence for assessing progress is included in column 4 but will not always be collected and reported annually. The implementation committee will also collaborate with various academic and support units to identify targeted initiatives to advance the institution in achieving the specific goals and sub-goals included in the plan. An important activity during the initial stages of the plan’s implementation, and led by the Vice President for Research, will involve identifying WSU’s strategic areas of research excellence and emerging areas requiring additional investment to achieve national and international prominence. With the assistance of the implementation committee, an annual report of progress will be issued by the Office of the Provost at the conclusion of each calendar year. Campuses, colleges, and other units will be expected to identify and report annually on their progress toward metrics consistent with, and whose attainment will contribute to, the institution-level plan.

## ➤ Theme 1: Exceptional Research, Innovation, and Creativity

- Goal 1:** Increase productivity in research, innovation, and creativity to address the grand challenges and opportunities of the future.
- Goal 2:** Further develop WSU’s unique strengths and opportunities for innovation, discovery, and creativity based on its location and land-grant mandate to be responsive to the needs of Washington state.
- Goal 3:** Advance WSU’s reach both nationally and internationally in existing and emerging areas of achievement.

Theme 1 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 1.a.</b> Grow and diversify extramural research funding.</p>	<ul style="list-style-type: none"> <li>• Invest in strengthening the most successful centers and institutes.</li> <li>• Enhance administrative infrastructure to support grants and contracts procurement and management.</li> <li>• Cultivate mutually beneficial strategic alliances with partners in the United States and abroad, to extend WSU faculty expertise and to address gaps in equipment, infrastructure, and/or expertise.</li> <li>• Foster greater collaboration across colleges, campuses, and disciplines through use of incentives and eliminating barriers to the pursuit of large opportunities.</li> </ul>	<ol style="list-style-type: none"> <li>1. Total research and development expenditures (reported to NSF) and rank among public institutions</li> <li>2. Federal research and development expenditures (reported to NSF) and rank among public institutions</li> <li>3. Number of cross-disciplinary and multi-institution grant interdisciplinary awards (tracked by eREX and org/budget numbers, OGRD)</li> </ol>	



Theme 1 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 1.b.</b> Attract, retain, and develop high-quality research faculty members system-wide.</p>	<ul style="list-style-type: none"> <li>Recruit high-quality faculty through opportunistic searches, targeted hiring of senior faculty, and expanding the number of endowed chairs.</li> <li>Define and enforce high scholarship expectations across all academic units.</li> <li>Expand research and creative outputs typically associated with the arts, humanities, and design disciplines.</li> <li>Facilitate hiring that creates critical mass for high-priority initiatives.</li> <li>Invest in professional development activities aimed at increasing research productivity.</li> </ul>	<ol style="list-style-type: none"> <li>Number of refereed publications per faculty FTE</li> <li>Number of publications, juried or adjudicated shows, and performances by arts and humanities faculty (college reports)</li> <li>Number of prestigious faculty awards</li> <li>Citations per faculty member (H Index)</li> <li>Number of National Academy members</li> </ol>	<ul style="list-style-type: none"> <li>National/international invitations for research/teaching papers and presentations, shows, and performances (college reports)</li> <li>ADVANCE data on external mentors</li> </ul>
<p><b>Sub-goal 1.c.</b> Develop and sustain the physical and technological infrastructure, resources, and expertise to support increased research and scholarly productivity system-wide, with particular emphasis on core laboratories and academic computing.</p>	<ul style="list-style-type: none"> <li>Develop funding mechanisms to maintain equipment and provide necessary staff support in core labs.</li> <li>Continue to invest in modern research buildings structured to facilitate collaboration.</li> <li>Enhance academic computing capability on all campuses.</li> <li>Invest in communication tools enabling virtual collaboration on a global scale.</li> </ul>	<ol style="list-style-type: none"> <li>Total capital expenditures on academic infrastructure</li> <li>Square footage allocated to research and development per tenure-track faculty FTE</li> <li>Number of labs, classrooms, and conference rooms equipped for virtual collaboration</li> </ol>	<ul style="list-style-type: none"> <li>State funded building projects</li> <li>Sponsored project infrastructure awards</li> <li>Annual report from Information Technology on investments and upgrades</li> </ul>
<p><b>Sub-goal 1.d.</b> Build upon WSU's current and emerging areas of research excellence and international reputation.</p>	<ul style="list-style-type: none"> <li>Invest in identified areas of research excellence, such as health sciences at the human-animal interface, clean technology, food security, and biomedical research.</li> <li>Assess and respond to emerging opportunities through strategic investment in new areas of research excellence (e.g., promoting and sustaining health, water resources, computing, and data analysis).</li> <li>Continue the expansion of health science research programs, with emphasis on the build-out of programs and facilities on the Spokane campus.</li> <li>Establish a stimulus fund for investment in priority research initiatives.</li> </ul>	<ol style="list-style-type: none"> <li>Sponsored research expenditures in identified areas of research excellence</li> <li>Sponsored research awards expenditures in emerging areas of research excellence</li> <li>Sponsored research awards to projects that engage multiple units</li> </ol>	<ul style="list-style-type: none"> <li>Faculty hires in priority areas (college reports)</li> <li>Faculty hires in emerging areas of research excellence (college reports)</li> <li>Media tracking by University Communications of coverage for areas of emphasis</li> </ul>
<p><b>Sub-goal 1.e.</b> Increase engagement and productivity of graduate students, postdoctoral associates, and undergraduates in mentored research, innovative projects, and creative endeavors.</p>	<ul style="list-style-type: none"> <li>Expand graduate student enrollment and engagement at the urban campuses.</li> <li>Enhance opportunities for graduate student research awards and scholarships.</li> <li>Reward graduate students for high scholarship and creative activities.</li> </ul>	<ol style="list-style-type: none"> <li>Number of publications coauthored by graduate students, postdoctoral associates, and undergraduate students</li> </ol>	<ul style="list-style-type: none"> <li>Number of presentations at SURCA and GPSA annual research presentation events and professional meetings</li> <li>Number of Honors theses completed (Honors College report)</li> </ul>





## ➤ Theme 2: Transformative Student Experience

- Goal 1:** Provide an excellent teaching and learning opportunity to a larger and more diverse student population.
- Goal 2:** Provide a university experience centered on student engagement, development, and success, which prepares graduates to lead and excel in a diverse United States and global society.
- Goal 3:** Improve curricular and student support infrastructure to enhance access, educational quality, and student success in a growing institution.

Theme 2 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 2.a.</b> Enhance student engagement and achievement in academics and cocurricular activities.</p>	<ul style="list-style-type: none"> <li>• Enhance the physical and technological infrastructure to support and facilitate innovation in teaching and learning.</li> <li>• Augment the resources and technical expertise available to faculty and staff to improve teaching and learning.</li> <li>• Increase, recognize, and reward innovation in teaching, learning, and student life.</li> <li>• Improve retention through an enriched set of student experiences.</li> <li>• Provide support services that facilitate the achievement of high academic performance expectations in a focused area of study.</li> <li>• Provide inclusive, responsive, and student-led cocurricular activities, including registered student organizations, student government, and Residence Life activities.</li> </ul>	<p>16. Percent of undergraduate degrees with all six program assessment elements in place, including use of student learning assessment results in decision-making or planning</p> <p>17. Percent of graduate degree programs using student learning assessment results in decision-making or planning</p> <p>18. Bachelor's degrees awarded (total, high-demand fields, low-income students)</p> <p>19. Graduate degrees awarded (master's, doctoral, professional, high-demand and STEM fields)</p> <p>20. Number of internship or practicum experiences (National Survey of Student Engagement and college reports)</p> <p>21. Percentage of classrooms meeting benchmark quality standards</p>	<ul style="list-style-type: none"> <li>• Honors enrollment</li> <li>• Students on President's Honor Roll (3.5 and above) each semester</li> <li>• Student satisfaction: percent of seniors and graduate students satisfied with academic experience (Educational Benchmarking Incorporated Survey)</li> <li>• National Survey of Student Engagement, alumni surveys, senior survey</li> <li>• Research, scholarly, and creative activities conducted with a faculty member outside of course or program requirements (National Survey of Student Engagement)</li> <li>• Course-based civic engagement activities (National Survey of Student Engagement)</li> <li>• UCORE assessments of quality (Office of Assessment of Teaching and Learning)</li> <li>• International Programs' report on clubs, international internships, Global Case Competition, community service activities</li> <li>• eLearning and other relevant grants</li> <li>• Percent of students satisfied with facilities and equipment in classrooms and labs</li> <li>• Housing services survey (Educational Benchmarking Incorporated)</li> <li>• Number of graduate students on external fellowships (Graduate School)</li> <li>• LibQual and other library service assessments</li> </ul>



Theme 2 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 2.b.</b> Increase the size, diversity, and academic preparedness of the undergraduate and graduate student populations in Pullman and at the urban campuses.</p>	<ul style="list-style-type: none"> <li>• Build a stronger support structure to recruit and retain transfer students.</li> <li>• Develop stronger outreach and recruitment for high-achieving underrepresented students.</li> <li>• Invest in effective recruiting programs for high-achieving out-of-state students.</li> <li>• Invest in graduate student recruitment and mentoring initiatives and programs for underrepresented groups.</li> </ul>	<p>22. Total university enrollment (bachelor's, master's, doctoral, professional)</p> <p>23. Percent of student body from underrepresented groups (undergraduate, graduate, professional)</p>	
<p><b>Sub-goal 2.c.</b> Produce graduates who are highly sought by post-baccalaureate and post-graduate employers and graduate/ professional programs.</p>	<ul style="list-style-type: none"> <li>• Assess and respond to emerging opportunities through strategic investment in new programs.</li> <li>• Broaden student engagement with cultures, ideas, and artistic expression of people of our diverse nation and world.</li> <li>• Facilitate student engagement in high-impact learning experiences.</li> <li>• Expand international dual degree programs in graduate education.</li> <li>• Devise four-year pathways for students that integrate career and personal development activities with academic degree plans.</li> <li>• Ensure that faculty have ready access to information regarding student achievement of fundamental competencies valued by employers (writing, critical thinking, problem-solving, etc.).</li> </ul>	<p>24. Alumni survey: percent of graduates employed within 1 year in a job relevant to their degree</p>	<ul style="list-style-type: none"> <li>• Career Center reports: <ul style="list-style-type: none"> <li>—employer activity at career expos, hiring, interviews</li> <li>—internship data</li> <li>—Student activity as logged in the career database</li> </ul> </li> <li>• Evidence of relevant programming (college reports)</li> <li>• National Survey of Student Engagement survey items on global perspectives</li> <li>• Info Literacy module results from the Educational Benchmarking Incorporated (Housing) reports</li> <li>• Common Reading and Freshman Focus assessments</li> <li>• Office of International Programs' report on global competencies of students</li> </ul>
<p><b>Sub-goal 2.d.</b> Align student recruitment, admissions, and retention system-wide to enhance access, inclusiveness, and student success.</p>	<ul style="list-style-type: none"> <li>• Support and encourage engagement in wellness, safety, artistic, and civic programs and activities.</li> <li>• Support and encourage programming that cultivates and supports healthy decision making and academic skills.</li> <li>• Augment the resources and technical expertise to support and assess data-informed enrollment management and student support programming.</li> <li>• Support innovations in advising technology and processes that increase time spent advising relative to time spent on enrollment logistics.</li> </ul>	<p>25. Freshmen retention rate (all students, low income, underrepresented groups, first generation)</p> <p>26. Four-year graduation rate (all students, low income, underrepresented groups, first generation)</p> <p>27. Six-year graduation rate (all students, low income, underrepresented groups, first generation)</p> <p>28. Percent of students who complete: <ul style="list-style-type: none"> <li>—master's degree within four years as compared to peers in similar disciplines</li> <li>—doctoral degree within eight years as compared to peers in similar disciplines</li> </ul> </p> <p>29. Average SAT of incoming freshmen</p>	<ul style="list-style-type: none"> <li>• Student progress indicators on state dashboard (Public Centralized Higher Education Enrollment System)</li> <li>• Percent of direct-from-high-school students completing college-level math and English within two years</li> <li>• Percent of first-year students who complete a full or part-time load in first year</li> <li>• Course completion (percentage of credit hours completed out of those attempted)</li> </ul>



## ➔ Theme 3: Outreach and Engagement

- Goal 1:** Increase access to and breadth of WSU’s research, scholarship, creative, academic, and extension programs throughout Washington and the world.
- Goal 2:** Expand and enhance WSU’s engagement with institutions, communities, governments, and the private sector.
- Goal 3:** Increase WSU faculty, staff, and students’ contributions to economic vitality, educational outcomes, and quality of life at the local, state, and international levels.

Theme 3 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 3.a.</b> Increase the impact of WSU research, scholarship, creative, and outreach activities on quality of life and economic development within the state and region.</p>	<ul style="list-style-type: none"> <li>• Increase integration of extension and continuing education activities throughout the institution to bolster the reach and impact of WSU.</li> <li>• Increase the amount and impact of intellectual property resulting from WSU research.</li> <li>• Develop new strategies for outreach in urban areas of Washington and the western United States.</li> <li>• Increase capacity to support effective program impact assessment.</li> <li>• Repurpose and repackage extension programs into continuing education and for-credit offerings through the Global Campus.</li> </ul>	<ul style="list-style-type: none"> <li>30. Estimated annual economic impact of WSU activities</li> <li>31. Number of start-up businesses from WSU research and outreach</li> <li>32. Total research and development expenditures from industry (reported to NSF)</li> <li>33. Patents applied for/awarded</li> <li>34. Number of participants in non-credit educational programs offered by Global Campus and WSU Extension</li> <li>35. Total annual expenditures in Extension</li> <li>36. Royalties and other revenue from commercialization activities</li> </ul>	<ul style="list-style-type: none"> <li>• Impact statements from WSU Extension</li> <li>• Digital collection numbers from WSU Libraries</li> <li>• WSU Research and Exchange Repository</li> <li>• Engagement in state and regional Extension and continuing education activities (WORQs)</li> <li>• Extension contacts with industry to increase awareness of WSU programs</li> <li>• Internships from alumni and constituency representatives</li> </ul>
<p><b>Sub-goal 3.b.</b> Increase access to the WSU system for place-bound, non-traditional, and other underserved and underrepresented students.</p>	<ul style="list-style-type: none"> <li>• Respond to the unique educational needs of urban campus communities and regions through academic and research programs.</li> <li>• Prepare faculty to effectively utilize alternative, technology, and distributed delivery methods in instruction.</li> <li>• Cultivate faculty and staff ability and motivation to cognitively and affectively connect with a diverse student audience.</li> <li>• Significantly expand the number and diversity of online degree programs offered through the Global Campus.</li> <li>• Support full access for students with disabilities through appropriate and timely accommodations for housing and dining, academic coursework, and cocurricular experiences.</li> </ul>	<ul style="list-style-type: none"> <li>37. Enrollment in and numbers of Global Campus programs and courses</li> <li>38. Total undergraduate and graduate enrollment (minority, first-generation, low-income)</li> <li>39. Urban campus enrollment (Spokane, Tri-Cities, Vancouver)</li> <li>40. Enrollment at other sites (e.g., Bremerton, Everett)</li> </ul>	



Theme 3 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 3.c.</b> Contribute to economic security, stability, social justice, and public policy through research, education, the arts, extension, and citizen-based and public policy engagement.</p>	<ul style="list-style-type: none"> <li>• Increase and recognize engagement of WSU faculty, students, and professional staff with institutions, communities, governments, other educational partners, and the for-profit and nonprofit sectors.</li> <li>• Encourage and incentivize short-term faculty-industry exchange programs.</li> <li>• Enhance extension program delivery to underrepresented audiences.</li> </ul>	<p>41. Number of academic units or programs with advisory boards that include alumni and constituency representatives</p> <p>42. Service hours, service courses, and service learning projects linked to the Center for Civic Engagement and similar programs</p> <p>43. Total annual university operating and capital expenditures</p>	<ul style="list-style-type: none"> <li>• International Programs-led projects that allow faculty, students, and staff to become involved globally (Global Campus)</li> <li>• Research and engagement activities with institutions, communities, governments, and the private sector (center reports, OGRD)</li> <li>• Office of Economic Development reports</li> <li>• Number of programs including community internships</li> <li>• Number of faculty conducting research that involves community partners (college reports)</li> <li>• Service hours spent on engagement activities (e.g., CEE, Cougsync, NEW Pathways to Success)</li> <li>• IP service learning metrics</li> </ul>
<p><b>Sub-goal 3.d.</b> Increase WSU's global presence and impact worldwide.</p>	<ul style="list-style-type: none"> <li>• Increase opportunities to engage in intercultural exchange and outreach for faculty, students, and international partners.</li> <li>• Expand WSU's footprint across the globe in strategic areas of excellence and impact (e.g., health, agriculture, and sustainability).</li> </ul>	<p>44. International student enrollment</p> <p>45. Number of faculty participating in international activities</p> <p>46. Number of students participating in study abroad and other significant international experiences</p>	<ul style="list-style-type: none"> <li>• Immersion opportunities for students whether abroad or local (IP report)</li> <li>• International Programs-led projects that allow faculty, students, and staff across the institution to become involved globally (IP report)</li> <li>• Internships that offer intercultural opportunities (IP report)</li> <li>• Number of grants with international/intercultural foci (IP Report)</li> </ul>
<p><b>Sub-goal 3.e.</b> Improve WSU's reputation with external constituencies.</p>	<ul style="list-style-type: none"> <li>• Increase strategic communication with key external stakeholders and between internal stakeholders about the impact of WSU research, education, and outreach.</li> <li>• Increase and recognize engagement of WSU faculty, students, and professional staff with institutions, communities, governments, and the for-profit and nonprofit sector.</li> <li>• Continue to develop and actively participate in strategic coalitions at the local, state, and national levels.</li> <li>• Work collaboratively with federal, state, and local policy leaders to engage WSU in research, education, and outreach that addresses important policy issues.</li> </ul>	<p>47. USNWR institutional reputation score</p>	<ul style="list-style-type: none"> <li>• WSU's ranking and reputation scores in reputable national and global university rankings</li> <li>• Periodic surveys conducted by WSU to assess its image and reputation within Washington state</li> </ul>



## ➤ Theme 4: Institutional Effectiveness: Diversity, Integrity, and Openness

**Goal 1:** Create and sustain a university community that is diverse, inclusive, and equitable.

**Goal 2:** Cultivate a system-wide culture of organizational integrity, effectiveness, and openness that facilitates pursuit of the institution’s academic aspirations.

**Goal 3:** Steward and diversify resources invested by students, the public, and private stakeholders in a responsible way to ensure economic viability of the institution.

Theme 4 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 4.a.</b> Recruit, retain, and advance a diverse intellectual mix of faculty, staff, and students, including women and those from underrepresented groups.</p>	<ul style="list-style-type: none"> <li>Assure diversity and inclusion efforts are visibly and consistently supported at the highest levels of leadership (president, provost, chancellors, deans).</li> <li>Continue mentoring of assistant and associate professors and successful programs from Advance aimed at the hiring and advancement of women and underrepresented faculty.</li> <li>Develop and implement social media tools to improve outreach to underrepresented groups.</li> <li>Assess and reward data-informed efforts by colleges and areas to improve recruitment outreach to underrepresented groups.</li> </ul>	<p>48. Number of faculty from underrepresented groups 49. Number of staff from underrepresented groups 50. Faculty and staff retention rates 51. Number of women and faculty from underrepresented groups tenured or promoted to associate/full professor (rolling ten-year average)</p>	<ul style="list-style-type: none"> <li>Pell grant-eligibility data</li> <li>McNair scholar participation rates</li> <li>Percent of student body that is first-generation</li> <li>Percent of students and faculty in physical and life sciences, math, and engineering who are women or from underrepresented groups</li> <li>Annual progress on AA/EEO goals</li> </ul>
<p><b>Sub-goal 4.b.</b> Maintain respectful, inclusive, and equitable behavior in all university environments.</p>	<ul style="list-style-type: none"> <li>Maintain and strengthen units, programs, and spaces that promote community building, intercultural exchange, and a diversity of voices.</li> <li>Develop and implement system-wide training.</li> <li>Recognize contributions to an inclusive and respectful work environment in employee performance evaluations.</li> </ul>	<p>52. Key indicators from biennial institution-wide Employee Engagement Survey</p>	



Theme 4 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 4.c.</b> Increase employee productivity and satisfaction.</p>	<ul style="list-style-type: none"> <li>• Improve functionality of information technology systems for administrative processes, student services, and research.</li> <li>• Recognize productivity in employee performance evaluations.</li> <li>• Communicate openly and with appropriate timeliness on issues of relevance to students, faculty, staff, and external constituencies.</li> <li>• Reduce the administrative burden on high-performing faculty and staff.</li> <li>• Regularly review current work environments and processes for improvement.</li> <li>• Use data/information gathered from the employee engagement survey to improve work environment.</li> <li>• Provide resources for university-wide professional leadership development.</li> </ul>	<p>53. Average employee satisfaction rating from Employee Engagement Survey (faculty, staff)</p>	<ul style="list-style-type: none"> <li>• Financial support directed toward professional development of faculty and staff (Office of the Provost and Human Resources tracking)</li> <li>• Key indicators from regular institution-wide climate survey and other routine surveys (e.g., COACHE survey for faculty; HRS surveys)</li> </ul>
<p><b>Sub-goal 4.d.</b> Strengthen administrative accountability, innovation, creativity, openness, and collaboration to advance the University's mission.</p>	<ul style="list-style-type: none"> <li>• Undertake regular evaluation of academic units, programs, centers, and institutes to ensure resource alignment is consistent with university goals and productivity.</li> <li>• Conduct evaluation and implement improvement of administrative processes to ensure maximum efficiency and effectiveness.</li> <li>• Remove administrative barriers that prevent entrepreneurial innovation.</li> <li>• Improve administrative and academic analytics capabilities to improve decision making.</li> <li>• Improve day-to-day communication from university and college level administration.</li> </ul>		<ul style="list-style-type: none"> <li>• Institutional Effectiveness Council subgroup reports—evidence of streamlined procedures</li> <li>• WSU Annual Financial Report</li> </ul>



Theme 4 Sub-goals	Potential Initiatives and Tactics	Quantitative Metrics	Other types of evidence (qualitative, progress indicators, diagnostics)
<p><b>Sub-goal 4.e.</b> Utilize institutional strategic plans, valid and reliable data, and evaluation indicators to align investments of resources with institutional priorities.</p>	<ul style="list-style-type: none"> <li>• Engage key constituencies in decision making, governance, and strategic planning.</li> <li>• Report annually on progress toward goals of strategic plan.</li> <li>• Focus on harnessing individuals and units to partner on large, programmatic initiatives that advance WSU's intended institutional profile.</li> <li>• Establish a clear process for eliminating programs that no longer demonstrate viability.</li> <li>• Map institutional priorities to state and federal plans such as the Student Achievement Council.</li> </ul>		<ul style="list-style-type: none"> <li>• Institutional Effectiveness Council annual report</li> <li>• Strategic plan implementation committee annual report</li> </ul>
<p><b>Sub-goal 4.f.</b> Expand, diversify, and effectively steward funding to advance the University's mission.</p>	<ul style="list-style-type: none"> <li>• Expand revenue from summer session, online education, and not-for-credit offerings.</li> <li>• Maintain development resources at levels of campaign to assure annual fund raising in excess of \$100 million per year.</li> <li>• Develop private-public partnerships to access outside capital and increase the impact of WSU.</li> </ul>	<p>54. Annual private support (\$ million)</p> <p>55. Endowment assets (\$ million)</p>	

**120-DAY STUDY MEMBERSHIP ROSTERS**

EXECUTIVE REVIEW GROUP

MANAGEMENT & INTEGRATION GROUP

RESEARCH THEMES SUBCOMMITTEE

RESEARCH INFRASTRUCTURE SUBCOMMITTEE

FACULTY & STUDENT

ENGAGEMENT/PRODUCTIVITY SUBCOMMITTEE

OUTREACH, ENGAGEMENT & ECONOMIC  
DEVELOPMENT SUBCOMMITTEE



## Executive Review Group

Bill	Andrefsy	Dean, Graduate School
Anjan	Bose	Regents Professor, School of Electrical Engineering & Computer Science
Pat	Butterfield	Dean, College of Nursing
Renny	Christopher	Vice Chancellor, WSU Vancouver
Candis	Claiborn	Dean, Voiland College of Engineering and Architecture
Daryll	DeWald	Dean, College of Arts & Sciences
Anson	Fatland	Associate Vice President, Economic Development & External Affairs
Brian	French	Professor, Education/Ed. Leadership, Sport Studies and Ed. / Counseling Psych.
Yogi	Gupta	Regents Professor, Director, CAS/Institute for Shock Physics
Akram	Hossain	Professor & Interim Vice Chancellor for Research, Graduate Studies & External Programs, WSU Tri-Cities
Joan	King	Associate Vice President, Chief Budget Officer, Budget Office
Tim	Kohler	Regents Professor, Anthropology
Jill	McCluskey	Professor, School of Economic Sciences
Laura	Lavine	Associate Professor, CAHNRS/Entomology, Co-Chair Faculty Senate Research and Arts Committee
Ron	Mittelhammer	Regents Professor, Dean, CAHNRS
Grant	Norton	Dean, Honors College
Guy	Palmer	Regents Professor, Director, CVM/Paul G. Allen SGAH
Roger	Patterson	Vice President for Finance and Administration, Interim CIO, Information Technology Services
Larry	Pintak	Dean, Murrow College of Communication
Paul	Pitre	Dean, WSU - North Puget Sound at Everett
Gary	Pollack	Dean, College of Pharmacy
Ken	Roberts	Dean, College of Medical Sciences
John	Roll	Senior Vice Chancellor, WSU Spokane
Bryan	Slinker	Dean, College of Veterinary Medicine
Jay	Starratt	Dean, Libraries
Mike	Trevisan	Dean, College of Education
David	Whidbee	Dean, Carson College of Business
Esther	Pratt	Assistant Director, University Advancement/Corporate and Foundation Relations

# Management and Integration Committee

Erica	Austin	Vice Provost for Academic Affairs, Office of the Provost
Tim	Church	Associate Dean for Research, Education/Ed. Leadership, Sport Studies and Ed. / Counseling Psych.
Cindy	Corbett	Associate Dean for Research, College of Nursing
Dave	Field	Associate Dean for Research and Graduate Education, VCEA/School of Mechanical and Materials Engineering
Akram	Hossain	Interim Vice Chancellor for Research, Graduate Studies & External Programs, WSU Tri-Cities
Jim	Krueger	Regents Professor, Director of Research, Medical Sciences/CVM/Integrative Physiology and Neuroscience
Andrea	Lazarus	Asst. Vice President for Research Clinical Health Sciences
Terry	McElwain	Regents Professor, Associate Director, CVM/Paul G. Allen SGAH
Jim	Moyer	Associate Dean, CAHNRS/Director, Agricultural Research Center
Bruce	Pinkleton	Associate Director, Murrow College of Communication/Murrow Center for Media and Health Promotion
Christine	Portfors	Interim Director of Research and Graduate Education, WSU Vancouver
David	Sprott	Senior Associate Dean, CCB/Marketing
Paul	Whitney	Associate Dean for Research, CAS/Psychology
Esther	Pratt	Assistant Director, University Advancement/Corporate and Foundation Relations

## Research Themes Subgroup

Don	Bender, Co-Chair	Director, VCEA/Composite Materials and Engineering Center
Tom	Spencer, Co-Chair	Professor, CAHNRS/Animal Sciences
Tom	Besser	Professor, CVM/Veterinary Microbiology & Pathology
Aurora	Clark	Associate Professor, CAS/Chemistry; Interim Director of Materials Science and Engineering Doctoral Program
Cindy	Corbett	Associate Dean for Research, College of Nursing
Don	Dillman	Regents Professor, Deputy Director, CAS/Sociology/Office of Research/Social & Economic Sciences Research Center
Masha	Gartstein	Associate Professor, CAS/Department of Psychology
Scot	Hulbert	Interim Chair, CAHNRS/Plant Pathology
Don	Knowles	Research Leader, Animal Diseases Research/USDA-ARS/CVM/Veterinary Microbiology & Pathology
Mark	Kuzyk	Regents Professor, CAS/Physics
Chen-Ching	Liu	Professor & Director, Energy Systems & Innovation Center/VCEA/School of Electrical Engineering and Computer Science
Kathleen	McAteer	Assistant Vice Chancellor, WSU Tri-Cities/CAS/School of Biological Sciences
Michelle	McGuire	Associate Professor, CAS/School of Biological Sciences
Chris	Pannkuk	Director, CAHNRS/International Research & Agricultural Development
Dave	Slavit	Boeing Distinguished Professor, WSU Vancouver/CAS/Education/Teaching & Learning, Mathematics
Jesse	Spohnholz	Associate Professor, CAS/History
Doug	Walsh	Professor, CAHNRS/WSU Prosser/Entomology
Jonathan	Yoder	Professor & Director, Office of Research/Water Research Center/CAHNRS/School of Economic Sciences
Esther	Pratt	Assistant Director, University Advancement/Corporate and Foundation Relations
Geeta	Dutta	Proposal Management Unit Manager, OGRD/Office of Research Support Representative
Sarah	Wisdom	Grant and Contract Specialist, OGRD/Office of Research Support Representative

## Research Infrastructure Subgroup

Sue	Clark, Co-Chair	Regents Professor, CAS/Chemistry
Steve	Simasko, Co-Chair	Chair, CVM/Integrative Physiology and Neuroscience
Haluk	Beyenal	Associate Professor, VCEA/Chemical Engineering and Bioengineering
Tori	Byington	Information Technology
Doug	Call	Professor, CVM/Paul G. Allen SGAH
Dan	Costello	Assistant Vice President, Facilities Operations
Kenn	Daratha	Associate Professor, College of Nursing
David	Gang	Associate Professor, CAHNRS/Institute of Biological Chemistry
Scott	Hudson	Professor, VCEA/Electrical Engineering (Tri-Cities Campus)
Kelvin	Lynn	Regents Professor, Director, VCEA/School of Mechanical and Materials Engineering/Center for Materials Research
Christian	Mailhiot	Director, Center for Integrated Modeling and Simulation/CAS/Institute for Shock Physics
Ken	Nash	Professor, CAS/Chemistry
Jon	Oatley	Director, Center for Reproductive Biology/CVM/School of Molecular Biosciences
Jeffrey	Savage	Associate Professor, CAS/Music
David	Sprott	Senior Associate Dean, CCB/Marketing
Jonathan	Wisor	Associate Professor, Medical Sciences/CVM/Integrative Physiology and Neuroscience
Weihong (Katie)	Zhong	Professor, VCEA/School of Mechanical and Materials Engineering
Esther	Pratt	Assistant Director, University Advancement/Corporate and Foundation Relations
Dan	Nordquist	Director, OGRD/Office of Research Support Representative
Derek	Brown	Sub-award and Reporting Administrator, OGRD/Office of Research Support Representative

## Faculty and Student Engagement / Productivity Subgroup

Rebecca	Craft, Co-Chair	Chair, CAS/Psychology
Jonathan	Jones, Co-Chair	Director, CVM/School of Molecular Biosciences
Thom	Brown	Chair, CAS/Fine Arts
John	Browse	Regents Professor, Interim Director, CAHNRS/Institute of Biological Chemistry
Todd	Butler	Chair, CAS/English
Lori	Carris	Associate Dean, Grad School/CAHNRS/Plant Pathology
Yonas	Demissie	Assistant Professor, WSU Tri-Cities/VCEA/Civil & Environmental Engineering
Brian	French	Professor, Education/Ed. Leadership, Sport Studies and Ed. / Counseling Psych.
Rita	Fuchs-Lokensgard	Director, ADA Program/CVM/Integrative Physiology and Neuroscience
Michele	Hardy	Chair CVM/Veterinary Microbiology & Pathology
Kerry	Hipps	Chair, CAS/Chemistry
Jim	Krueger	Regents Professor, Director of Research, Medical Sciences/CVM/Integrative Physiology and Neuroscience
Brian	Lamb	Regents Professor, VCEA/Civil and Environmental Engineering/Laboratory for Atmospheric Research
Andrea	Lazarus	Asst. Vice President for Research Clinical Health Sciences
Steven	Parish	Professor, Veterinary Medicine, Veterinary Clinical Medicine and Surgery
Jim	Petersen	Director, VCEA/Chemical Engineering & Bioengineering
Amy	Wharton	Director, WSU Vancouver/CAS/Sociology
Esther	Pratt	Assistant Director, University Advancement/Corporate and Foundation Relations
Sammy	Rodriguez	Single Investigator-Small Team Research Support Coordinator, OGRD/Office of Research Support Representative
Tammy	McGreevy	Faculty Support Coordinator, OGRD/Office of Research Support Representative

## Outreach, Engagement, and Economic Development Subgroup

Sita	Pappu, Co-Chair	Director, Economic Development & External Affairs/Office of Commercialization
Juming	Tang, Co-Chair	Regents Professor, Associate Chair, CAHNRS/Biological Systems Engineering
Ian	Burke	Associate Professor, CAHNRS/Crop and Soil Sciences
Ralph	Cavalieri	Associate Vice President, Alternative Energy
Liv	Haselbach	Associate Professor, VCEA/Civil and Environmental Engineering
Stacey	Hust	Associate Professor, Murrow College of Communication
Hanwu	Lei	Assistant Professor, WSU Tri-Cities/CAHNRS/Biological Systems Engineering
Xiaodong	Liang	Assistant Professor, WSU Vancouver/Electrical Engineering and Computer Science
Linda	MacLean	Associate Dean of Advancement, Pharmacy/Pharmacotherapy
Matt	McCluskey	Chair, CAS/Physics
Katrina	Mealey	Professor and Richard L. Ott Endowed Chair, CVM/Veterinary Clinical Sciences
Grant	Norton	Dean, Honors College
Todd	Norton	Associate Professor, Murrow College of Communication
Alyssa	Patrick	Communications Coordinator, Office of Economic Development & External Affairs
Erin	Rice	Director of Operations, International Programs
Eric	Sorensen	Science Writer, University Communications/Washington State Magazine
Kimberly	Withey	Associate Director, DTC and Associate Professor, CAS/English
Esther	Pratt	Assistant Director, University Advancement/Corporate and Foundation Relations
Nancy	Shrope	Assistant Director, OGRD/Office of Research Support Representative
Pam	Kelley	Program Specialist, OGRD/Office of Research Support Representative

**FINAL STUDY CONCLUSIONS DOCUMENTS**

DEFINITIONS & CHARACTERISTICS OF A  
GRAND CHALLENGE

ALA FACILITATED MEETING NOTES

FINAL STUDY CONCLUSIONS WORKING  
SPREADSHEET

AAU MEMBERSHIP REQUIREMENTS

## GRAND CHALLENGE DEFINITION

Grand Challenges are ambitious, but achievable goals that harness WSU and partner research, scholarly and creative capabilities to solve important national or global problems and that have the potential to capture the public's imagination.

WSU Grand Challenges must be inspirational and inclusive.

## GRAND CHALLENGE CHARACTERISTICS

Criterion	Key question(s)
<b>Grand Challenge</b>	Is the theme framed (articulated) as a grand challenge, and not just a topic or subject of inquiry?
<b>Inspirational</b>	Is the theme framed in a way that is accessible to non-academics and captures the reader's imagination? Would a politician or community leader value the search for solutions related to this theme?
<b>Multidisciplinary</b>	Is the theme truly multidisciplinary, calling upon intellectual resources from a demonstrably diverse set of disciplines?
<b>Inclusive</b>	Is the theme broad enough to include diverse types of inquiry? Is it evident how WSU's professional fields, Social Sciences, Humanities, and Arts intersect with the theme?
<b>Non-aligned</b>	Does the name of the theme contain words closely associated with one or more disciplines or academic units within the University? If so, the name of the challenge theme should be reworded.



## ACADEMIC LEADERSHIP ASSOCIATES, LLC

Academic Leadership Associates (ALA) provides advisory services for higher education institutions around the globe in the areas of strategic planning for institutional leadership, academic and administrative affairs, budgeting, crisis management and preparedness, and international affairs. ALA's objective is to help their clients create and sustain competitive advantage in the complex and evolving higher education landscape. ALA offers its clients a wealth of expertise and established relationships with higher education leaders in the United States, Europe, Asia, the Middle East and Russia.

Established in 2005 by Michael A. Diamond and Mark Power Robison, ALA advises clients on the development and implementation of strategic plans, assessing and meeting strategic leadership needs, developing useful and appropriate methods of transparency and accountability to institutional stakeholders, devising programs of self-assessment and self-evaluation, as well as creating and implementing crisis preparedness strategies and comprehensive programs of international engagement.

The partners, senior advisors and associates of ALA provide a broad spectrum of services ranging from the design and facilitation of targeted discussions or retreats for trustees, institutional leaders and/or faculty; to comprehensive advisory services leading to the design, creation, implementation and assessment of strategic plans, budget and financial plans, crisis preparedness protocols, and international engagements for a wide variety of higher education institutions. This range of consulting services, whether taken as a whole or focused on targeted needs, is tailored to meet the strategic goals of client institutions in response to their missions, values, strengths, and market opportunities.

**Michael A. Diamond, Senior Partner**, served as Vice President and Executive Vice Provost of the University of Southern California (USC) until 2005, after being appointed Vice Provost for Planning and Budget in 1995. In his capacity as Vice President and Executive Vice Provost, Diamond was responsible for managing the academic enterprise at the USC and overseeing an academic budget approaching \$1 billion. He had broad ranging responsibility for the academic enterprise including sole (and sometimes shared) oversight of the university's academic planning and budgeting process, strategic planning, institutional research, the selection of academic deans and their periodic evaluation, space planning, crisis management, student athlete academic advisement and responsibility for the university's five international offices. He served as dean of the Leventhal School of Accounting and director of the school's SEC and Financial Reporting Institute from 1987 through 1994. During that time period, the Leventhal School of Accounting was consistently ranked as one of the top five accounting programs in the country. Diamond retains his tenured professor position at USC with appointments in the Marshall School of Business, the Rossier School of Education and the School of Social Work.

**Mark Power Robison, Managing Partner**, served as Academic Planning Officer at the USC, where he coordinated a two-year strategic planning process leading to the creation of USC's new strategic plan in 2004. He also co-directed the university's academic program review process, whereby every academic unit receives regular assessments of their academic programs and research activities. His responsibilities also included aspects of accreditation, communications, and international partnerships. Robison retains a faculty appointment at USC in the Rossier School of Education and he also holds an appointment in the Department of History. In the Rossier School he also serves as Director of the Higher Education Leadership Institute and director of APRISE, the Asia Pacific Rim International Study Experience. Dr. Robison is also a researcher in the USC-Huntington Early Modern Studies.

## ACADEMIC LEADERSHIP ASSOCIATES, LLC

December 15, 2014 facilitated meeting notes

### Breakout session 1:

Groups had 45 minutes to discuss the preliminary Grand Challenge research theme suggestions from the Research Themes Subcommittee as well as the suggested potential themes suggested by ALA or others that were suggested.

**Deliverable:** A non-prioritized list of the top five themes, and the reasoning behind those selections

### Breakout session 2:

Each of the themes identified in the previous breakout session had one (or more) group(s) assigned to discuss further.

**Deliverable:** Identify the key areas of research strengths within the university that support the theme they were assigned and, identify the Tier 1 research strengths that are “must have” capabilities and which strengths are Tier 2 “important” areas.

### Results:

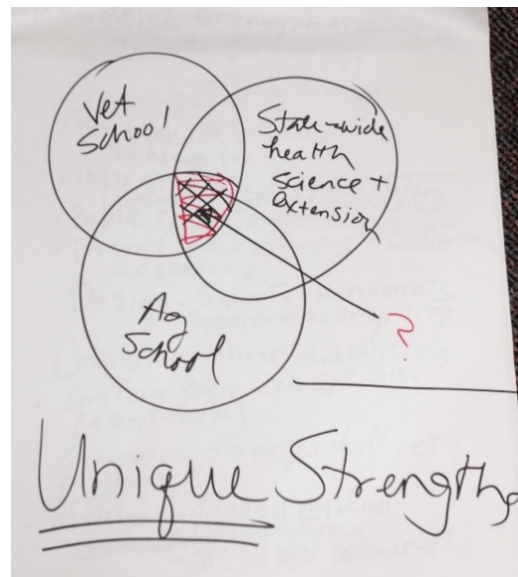
#### Group 1 Challenge:

#### Advancing and sustaining human and animal health and well-being.

Lead: C. Corbett, S. McGuire

- Healthy Living: Human, animal and environment
- Human and animal interactions
- Sustaining Health
- Well Being
- Rural Health
- Socio-cultural items - Africa, etc.
- Locally and globally

The group created the Venn diagram showing interrelationships.



Venn diagram showing the Vet School, the Ag School and State-wide health, science and extension interconnected.

**Group 2 Challenge:****Securing food, energy, water and resources for a sustainable society.***Lead: J. Moyer, S. Hulbert*

- Environment
- Health
- Food
- Biofuels
- Social Sciences - Adopt innovation
- Sustainable agriculture

Refer to list of research strengths and tiered list

**Tier 1:**

Basic Plant Sciences  
 Crop Production Systems  
 Biofuels & Bioproducts  
 Economics  
 Natural Resources  
 Materials Science  
 Ecology  
 Energy Systems  
 STEM Education  
 Science Communication

Bioenergy &amp; Catalysis

Advanced Materials

Power Engineering

Air &amp; Water

Environmental Sciences

**Tier 2:**

Media Psychology &amp; Comm. Processes

Leadership and Innovation in Teaching and Learning

Interior and Landscape Design

**Group 3 Challenge:****Creating a thriving society in a diverse and dynamic world by advancing human opportunity and capacity.** *Lead: T. Church, D. Sprott*

- Expanding civilization and individual cultural vitality
- Educational access for all
- How do you create equal opportunity in society?
- STEM education
- Application of innovative/novel methods and techniques

Refer to list of research strengths and tiered list.

**Tier 1:** College of Agriculture Human & Natural Resource Sciences: Human Sciences - Individual and Family Development, and Prevention Science.

College of Arts & Sciences: 1. Arts and Humanities - Understanding gender, race and culture through artistic expression and critical inquiry; 2. Social Sciences - Quantitative and qualitative analyses of

behavior and social systems; 3. Social Sciences - Causes and consequences of injustice and inequality; 4. Cross Disciplinary - Understanding diversity from genetic through cultural levels of analysis

College of Education: 1. STEM education; 2. Measurement and Evaluation; 3. Cultural and Linguistic Diversity; 4. Leadership and Innovation in Teaching and Learning; 5. Cultural Studies in Education; 6. Students with Disabilities

Murrow College of Communication: 1. Health promotion, media literacy, applications of new technologies to health promotion and health literacy; 2. Political communication, e-democracy, civic engagement and public affairs; 3. Science communication and risk communication; 4. Media psychology and communication processes and effects

WSU Vancouver: Math and Science Education

**Tier 2:** College of Business: 1. Behavioral Business Research; 2. Corporate Governance, Ethics and Stakeholder Relations; 3. Global Dimensions of Business

College of Agriculture Human & Natural Resource Sciences: Human Sciences - Economics: Agricultural, Behavioral, Consumer, Health, International, Marketing, Supply Chain, and Transportation

College of Arts & Sciences: 1. Arts and Humanities - Society, media, and digital technology; 2. Arts and Humanities - Historical and global perspectives on contemporary issues; 3. Cross Disciplinary - The social and cultural context of science and technology; 4. Cross Disciplinary - Understanding diversity from genetic through cultural levels of analysis.

College of Education: 1. Management and socio-cultural studies of sport; 2. Neuroscience/neuropsychology of education; 3. Educational technology

College of Nursing: Patient Care Safety and Quality

Also: Extension, International Programs and Office of Commercialization.

**Group 4 Challenge:**

**Creating adaptive technology and infrastructure for better living and a secure environment.** *Lead: D. Field, A. Clark*

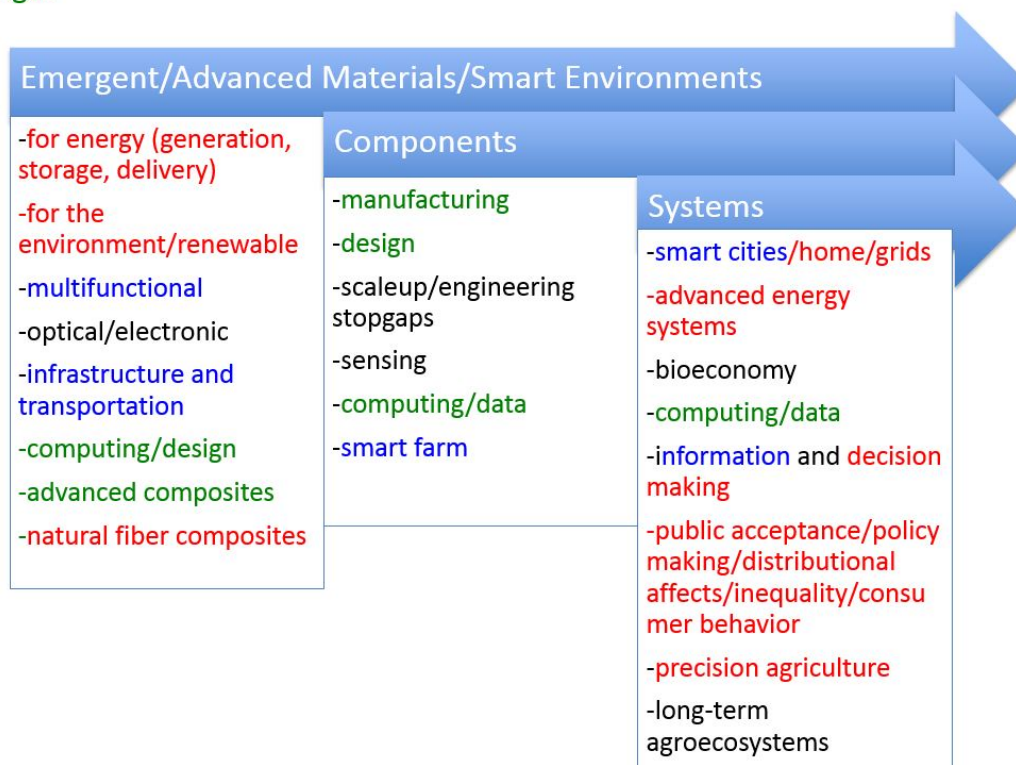
- Materials needed to respond to changing tech, cultural, environmental, etc.
- Smart cities
- Smart homes
- Machine Learning
- Smart Manufacturing
- Internet of things
- Decision aides
- Basic science

Refer to list of research strengths and tiered list.

- Materials for Energy – Infrastructure
- Smart Homes
- Smart Grid – Systems
- Renewable Materials – Bio-based Fuels
- Infrastructure and Transportation – Composite Materials/Natural Fiber
- Public Acceptance – Survey Design and Implementation
- Distributed Effects – Inequality
- Design – Smart Environments, Home, Community, City
- Computing – Information Analytics
- Long term agro-eco system (smart farm)
- Generation, Storage and Delivery of Energy
- Efficiency of Consumption – Conservation, Consumer Behavior

Existing Strength    Emerging Strength

Needed Strength



## ACADEMIC LEADERSHIP ASSOCIATES, LLC

### *January 16, 2015 facilitated meeting notes*

#### **Breakout session 1:**

Each group examined each of the (then) four Grand Challenge Research Themes, reviewing specifically the name and draft description of each theme. The groups were also tasked to craft a list of key terms that need to be present to reach important internal and external stakeholder groups, and also determine the extent to which national security might be incorporated into the draft themes.

**Deliverable:** An updated list of the research themes, plus any additional commentary regarding national security.

#### **Breakout session 2:**

Each group focused on a single theme (with two groups per theme) reviewing the list of existing, emerging and needed research strengths for edits or additions.

**Deliverable:** A set of sub-themes that would hone the list of university research strengths that align with the assigned theme.

#### **Results:**

**National Security Discussion:** Suggested adding 'security' as a 5<sup>th</sup> Grand Challenge instead of trying to fit it in to all of the others. If we look at the Department of State definition of National Security, it describes many of the things that WSU is good at (economic issues, food security, health, sustainability)

**Theme 1: Advancing Human Health:** Liked the new short title "Keeping People Healthy" – and sub-bullets:

- Healthy foods
- Understanding health
- Delivering Health and Wellness
- Maintaining Healthy Environments – Maybe "Environments that Support Health and Wellness"

Need to make clear who we are communicating this information to. This will determine how we phrase things.

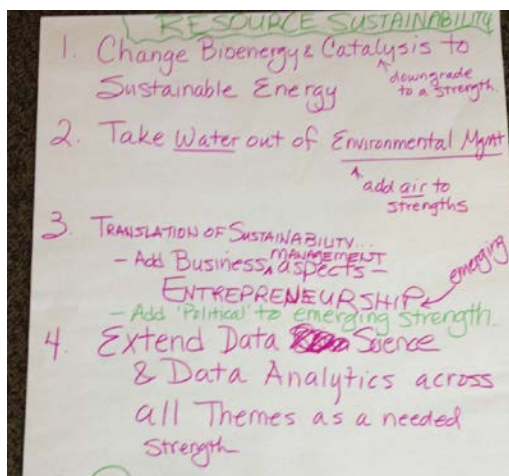
## Theme 2: Securing Food, Energy, and Water Resources for a Sustainable Society:

Recommend changing 'Bioenergy & Catalysis' to 'Sustainable Energy' and adding 'Bioenergy & Catalysis' to the Existing Strengths column. Also remove 'water' from the Environmental Resource Management title.

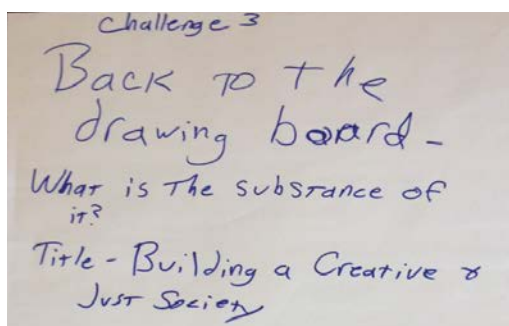
## Theme 3 - Advancing Human Capacity and Opportunity in Diverse, Knowledge-based Societies:

Recommendations include listing 'Building Innovative and Evidence-based Education', taking out 'Opportunity and Equality', plus general comments indicating the theme needs more conceptualizing. Also, this theme doesn't show many Emerging Strengths and Needed Strengths. An inordinate number are listed as existing strengths. Strengths should be listed for what WSU is really known for. There was also discussion on WSU educational strengths like serving the underserved and distance education, plus the audience issue where we need to recognize the tension between our internal & external audiences.

## Theme 4 - Improving Critical Infrastructure and Security through Adaptive Technology:



Theme 2: Breakout Session Notes



Theme 3: Breakout Session Notes

Many of the strength areas were moved around. Recommendations came in to include, not just the economics of science and technology but the 'Economics, social, and Policy aspects of deployment of Technology.' Also, under 'Smart Environments', separate out 'Smart Homes' and 'Smart Grids'. Strengths should be added, including 'smart materials and design disciplines, rural education and communication, dissemination of science and technology in rural environments. Also major themes were suggested, including design & manufacturing; material skeleton production, and computational computer science (data analysis). Questions on Human Capital and Natural Resources Development and Management not seeming like a theme, but more of a "grab-bag"

THEME	Existing (3B)	Emerging	Needed
Building <del>INNOVATIVE</del> 4 EVOLVING-BASED EDUC.	Dev + Assessment	Modeling Big Data Receptivity	High Performance Computing
	Cultural Studies <del>in Education</del>	GIS Distance Ed Innovative/Entrepreneurship	Access to <del>resources</del> Entrepreneurial Finance
			Understanding Social Impact & increasing rural implications of inclusion/exclusion
		Data Collection	Access to Big data sets INCREASED Stat Consulting
NO'S IN COMM!			

Theme 4 Breakout Session Notes



## Combined Recommendations Considered for Final

Sub -Committee Recommendations	
FSEP, OEED, Infra	Align faculty recruitment with WSU research aspirations
FSEP, OEED	Support departments in multi-year hiring plan
FSEP, OEED	Facilitate cluster hiring across colleges in grand challenge areas
FSEP, OEED	Target hiring associate & full professors
FSEP	Create more endowed professorships
OEED	Recruit the best students (trainees)
FSEP	Hire new faculty with the expectation that they will participate in collaborative activities
FSEP	Offer competitive faculty salary, start-up and consider admin requirements and space requirements before hiring
FSEP, OEED, Infra	Create systems within WSU to enable collaboration
Infra	Create a standing University infrastructure committee (UIC)
Infra	UIC to evaluate possible FIG vs. subcommittee-type approach
Infra	Create an adhoc committee to refine 'bins'
Infra	Create an adhoc committee to study other 'non-instrumentation' infrastructure needs & need for a small infrastructure grant program.
Infra	Create a centralized high-performance computing committee
FSEP, OEED	Create a task-force to link existing databases
FSEP, OEED	Define meaningful metrics for each college (unique to each discipline)
FSEP, OEED	Compare metrics to like-disciplines at peer institutions rather than between WSU disciplines/colleges
OEED	Create a faculty club
FSEP, OEED	Develop systems/ metrics/ recognition to accurately credit faculty collaborations (& students too)
FSEP	Create a culture that encourages & rewards excellence and collaboration at all stages of faculty career; recognize faculty contributions at various levels of faculty careers
FSEP, OEED	Increased support to prepare for prestigious awards
FSEP, OEED, Infra	Increased support to prepare and submit external grant proposals
FSEP, OEED	Provide additional travel funds to faculty
FSEP, OEED	Remove geographic barriers by bring academics to WSU, VPR to create a lecture series inviting notable academics to WSU
OEED	Develop means to recognize faculty efforts in Tech Transfer and economic development activities
OEED	Recognize / promote and reward faculty activities that deepen partnerships with industry & society (e.g. outreach, internships...)

## Combined Recommendations Considered for Final

OEED	Coordinate centralized & decentralized efforts to coordinate, communicate, train & promote opportunities to engage in outreach & economic development activities
FSEP, OEED	Develop mentor program to fast-track STAR junior faculty towards prestigious awards
OEED	Develop centralized coordination for international partnerships
OEED	Streamline communication channels between researcher to college to central communications personnel.
OEED	Clearly define WSU's 'message' to communicate research strengths consistently.
OEED	Create up-to-date, searchable web-engine optimized websites
M&I	Develop system for handling 'push-back' media on controversial research studies.
M&I	Create accessible systems for searching & tracking expertise & research interests (& up-to-date)
OEED	Provide training to recognize and communicate the 'good stories'
FSEP, OEED	Provide travel funds program to get new faculty to WA DC to meet with program managers of major funders

## *AAU Membership Indicators*

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The AAU presidents and chancellors have adopted the following set of membership indicators to use in assessments of current and potential new members. All indicators will be tabulated as both actual values and normalized, per-faculty measures where feasible. In assessing non-U.S. institutions, comparable indicators appropriate to those institutions will be used.

These indicators are divided into Phase I indicators, which will be used as the primary indicators of institutional breadth and quality in research and education, and Phase II indicators, which will be used to provide additional important calibrations of institutional research and education programs.

Both the Phase I and Phase II indicators constitute the first stage of membership assessment. The second stage involves a more qualitative set of judgements about institutions and their trajectories.

### *Phase I Indicators*

- 1) *Competitively funded federal research support*: The Membership Committee uses National Science Foundation (NSF) research expenditure data, excluding formula-allocated USDA research expenditures and American Recovery Reinvestment Act (ARRA) expenditures. Funding for the Agriculture Food and Research Initiative (AFRI), a competitively funded USDA research support program, is included in the Phase I research support indicator.
- 2) *Membership in the National Academies (NAS, NAE, IOM)*: The National Academies' membership database maintains the current institutional affiliation of its members.
- 3) *Faculty awards, fellowships, and memberships*: The Membership Committee gathers data on faculty awards, fellowships and memberships as an additional assessment of the distinction of an institution's faculty. Additional appropriate awards, fellowships, and memberships will be added to this list as they are identified.
- 4) *Citations*: Thomson Reuters *InCites*<sup>TM</sup> citations database provides an annually updated measure of both research volume and quality and will provide a valuable complement to the first four indicators listed above.

### *Phase II Indicators*

- 1) *USDA, state, and industrial research funding:* Though these three sources of academic research support fund important, high-quality research, they are treated as Phase II indicators since they are generally not allocated through competitive, merit-review processes. Competitively funded USDA research programs, such as AFRI, that can be separately identified in reported data are included in Phase I data.
- 2) *Doctoral education:* The Committee uses number of Ph.D.s granted annually, using Department of Education IPEDS (Integrated Postsecondary Education Data System) data. These data are treated as Phase II indicators to de-emphasize the quantitative dimensions of Ph.D. programs and avoid sending an unintended signal to institutions to increase Ph.D. output.
- 3) *Number of postdoctoral appointees:* The Committee uses NSF-compiled data from institutions on postdoctoral appointees, most of whom are in the health sciences, physical sciences, and engineering. Postdoctoral education is an increasingly important component of university research and education activities that the committee believes should be tracked in AAU membership indicators. However, because postdoctoral activity is highly correlated with university research and because self-reported postdoctoral data are less uniform than data on federally funded research, postdoctoral appointees are treated as a Phase II indicator.
- 4) *Undergraduate education:* The Committee assesses the institution's undergraduate programs to determine that the institution is meeting its commitment to undergraduate education. Recognizing that differing institutional missions among research universities dictate different ways of providing undergraduate education, the committee will be flexible in this assessment. A number of measures have been suggested, including some that focus on input and others that look primarily at output variables. These are at this time imperfect, but may provide some guidance to the committee in making its judgments on this topic.

*Attachment 1 shows the source of the indicator data.*

Adopted July 18, 2000  
Updated October, 2012

## *AAU MEMBERSHIP INDICATORS: Data Sources*

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### *Phase I Indicators*

#### *Competitively funded federal research support: federal R&D expenditures*

A three-year average of federal research expenditures (including S&E and non-S&E) adjusted to exclude ARRA and USDA formula-allocated research expenditures. This indicator does include annualized obligations for the AFRI program funded by USDA.

- National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges/Higher Education Research and Development Survey (HERD), data for the most recently available three-year average.  
<https://webcaspar.nsf.gov/index.jsp?subHeader=WebCASPARHome>.
- AFRI Obligations, data for the most recently available three-year average.  
USASpending.gov - <http://www.usaspending.gov/data>

#### *Memberships in the National Academies (NAS, NAE, IOM)*

Compiled from the membership lists of each academy; lists can be found at:

- National Academies of Sciences:  
<http://nas.nasonline.org/site/Dir?sid=1011&view=basic&pg=srch>;
- National Academy of Engineering: <http://www.nae.edu/default.aspx?id=20412>
- Institute of Medicine of the National Academies:  
<http://www.iom.edu/Global/Directory.aspx?type={A75AB05B-9C36-4917-8FE3-ACA7E5CC580C}>

#### *Faculty awards, fellowships, and memberships*

Number of faculty members by institution receiving awards, fellowships, and memberships in the National Research Council (NRC) list of highly prestigious awards that included: research/scholarship awards, teaching awards, prestigious fellowships or memberships in honorary societies. Data for Howard Hughes Medical Institute Investigator, Newberry Library Fellowship, Studies at Athens Award, and Research Corporation Cottrell Scholar Award are included as well.

- The Faculty Scholarly Productivity (FSP) Database, 2011. These data are reproduced under a contractual agreement with Academic Analytics. <http://academicanalytics.com/>.
- The list of the NRC highly prestigious awards can be found at:  
[http://sites.nationalacademies.org/PGA/Resdoc/PGA\\_044718](http://sites.nationalacademies.org/PGA/Resdoc/PGA_044718).

#### *Citations*

The average of the institution's citation data for the most recent three overlapping five-year increments (*e.g.*, 2005-2009, 2006-2010, 2008-2011).

- InCites™, Thomson Reuters (2011). Web of Science. ® These data are reproduced under a license from Thomson Reuters.  
[http://thomsonreuters.com/products\\_services/science/](http://thomsonreuters.com/products_services/science/).

## Phase II Indicators

### *USDA, state, and industrial research funding*

National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges/Higher Education Research and Development Survey (HERD), data for the most recently available three-year average.

<https://webcaspar.nsf.gov/index.jsp?subHeader=WebCASPARHome>.

### *Doctoral Education*

Number of doctorates compiled from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) completions survey data for the most recently available three-year average. <http://nces.ed.gov/ipeds/datacenter/Default.aspx>.

### *Number of Postdoctoral Appointees*

NSF-NIH Survey of Graduate Students & Postdoctorates in S&E, conducted by the NSF Division of Science Resources Statistics (SRS), data for the most recently available three-year average. <https://webcaspar.nsf.gov/index.jsp?subHeader=WebCASPARHome>.

## Faculty Counts for Normalization

The faculty counts for normalization are drawn from two sources:

- 1) IPEDS Salary Survey, data for the most recently available three-year average.

<http://nces.ed.gov/ipeds>.

### *IPEDS Employee Assigned by Position (EAP) Descriptors:*

- Full-time – tenure track faculty (full-time non-medical)
- Primarily Instruction
- Primarily Research
- Instruction combined with research/public service

- 2) For institutions with medical schools, the average for the most recently available three-year average basic science medical school faculty counts, as compiled by the Association of American Medical Colleges, are added to the IPEDS total.

<https://www.aamc.org/data/facultyroster/reports/>.

Adopted January 18, 2002

Updated October, 2012

## **APPENDIX D**

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# **EXECUTIVE REVIEW GROUP FEEDBACK REPORTS**

NOVEMBER 2014 EXEC REVIEW FEEDBACK

DECEMBER 2014 EXEC REVIEW FEEDBACK

# Executive Review Group Comments on the 120 Day Study

November, 2014



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**Tim Kohler**, Regents Professor, Archaeology ..... 13

**Ron Mittelhammer**, Dean, College of Agricultural, Human, and Natural Resource  
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## Summary of Comments

### Question 1: Comment on overall study progress, including:

#### a. Development of "grand challenge" research themes.

##### *Bill Andrefsky*

- Select broad or more consuming topics that encompass specific or narrow suggestions
  - Specific topics can be organized under larger theme
  - 3-4 broad research themes and 2-5 specific initiatives with very focused goals
- Inclusion of research themes that are not linked to funding sources but are important to research mission, and wrap them into larger initiatives for mutual benefit of both initiatives

##### *Patricia Butterfield*

- Suggested grand challenge research theme of “Transforming health and healthcare to serve all Washingtonians”
  - Lynch pin for WSU is commitment to transforming delivery systems in ways that are proactive, use healthcare workforce in novel ways, and involves rural communities as full partners

##### *Yogendra Gupta*

- WSU must think broadly, be aspirational, and focus on the future
  - Less emphasis on near-term applicability

##### *Tim Kohler*

- Research Themes committee doesn’t seem to be using suggestions gathered online
  - Seem to be starting from other sources, which are unclear
- Committee is quickly coalescing around a few not-surprising themes (health, water, energy)
  - While they correspond to WSU’s historic strength or intersect with land-grant status, worry about “premature convergence” of determining themes before considering other inputs
- Themes identified so far have dimensions of interest for scholars who study past, and think about future, that are not adequately developed.
  - What are the implications for the future of WSU research in any of these areas?
- “Small science” problem
  - Small pockets of excellence in a few areas which are not big enough or well-funded to merit inclusion in grand research themes
  - Is there a way to acknowledge this within this exercise?

##### *Ron Mittelhammer*

- Environmental themes could be better represented on the Research Themes committee
  - Someone from CEREO or SoE?
- What are the societal, industry, welfare, and economic development issues that we are targeting by research theme definitions? It would be helpful to have clearer rationale/connections, and these must mesh with WSU's strengths and capabilities.
- What overall criteria are being used to inform the definition of research themes? These need to be articulated.

**b. Definition of Research Infrastructure "bins" and a plan to manage them.**

*Bill Andrefsky*

- Need for central management system for infrastructure components that links scholarship with funding that supports infrastructure.
- Compilation and tracking of infrastructure components
  - Office of Research as central office with infrastructure bins

*Patricia Butterfield*

- Bins framed in a way that perpetuates, inaccurately, a split between laboratory and clinical level science
- We may have research infrastructure needs for GIS and spatial health data

*Yogendra Gupta*

- Larger "bins" and strategic thinking is needed, otherwise the sub-group will drown in too much information

*Ron Mittelhammer*

- Ask Research Infrastructure subgroup to devise more directed process with more strategic and centralized set of objectives for updating relevant infrastructure inventory next time
- What principles or rationale are being followed in defining bin categories?
- Categorize by discipline's potential use and by equipment/facility/infrastructure function?
  - Important to identify what cores service what disciplines effectively

**c. Progress toward Identification of key issues and development of findings, recommendations, and metrics for the Faculty and Student Engagement/Productivity and Outreach/Economic Development subgroups.**

*Bill Andrefsky*

- Align faculty productivity metrics with AAU benchmarks across all disciplines
- Internal metrics to help with AAU benchmarks

- E.g., T/TT faculty serving as student committee chairs
- Recognition of units that are central to the research mission and those that are central to teaching mission

*Patricia Butterfield*

- Importance of opportunities for spousal/partner accommodation, especially in recruitment of female faculty

*Yogendra Gupta*

- Not clear where the other two sub-groups are headed
  - Too many anecdotal comments and lack of clear objectives

*Ron Mittelhammer*

- Need to articulate how we can raise program quality to a given high standard uniformly while also strategically investing/promoting pockets of true excellence/preeminence
- Need to jettison any lingering culture that suggests that we can be all things to all people, and that all current activities and efforts can continue to be supported in an egalitarian way.
- Faculty and Student Engagement/Productivity Group produced a recommendation summary that effectively inventories the gamut of activities and functions that need to drive any aspiring university, and underscore what I would think are reasonably well known.
  - What are the priorities for these at WSU?
  - Where is additional emphasis needed?
- Inventory of “things to do”, and associated conclusions make sense, but underscore issues that were pretty much known. We need to consider action steps/procedures/processes that will actually implement the recommendations that were listed.
  - Example – chairs are generally oversubscribed and might not be the “go to” people to ensure awards are pursued. In fact, we have ample evidence that this is the case. Do we need a more formalized award nomination policy/process? More centralized approach? Supported with additional resources, or provided more recognition/reward in the expectation/review of the “service component” of one’s responsibilities? What would that be?

**d. Identification of "barriers" to research excellence.**

*Yogendra Gupta*

- Comment on needs (rather than barriers): WSU research is too focused on applications
  - Need to strike a better balance regarding fundamental research

- Need to invest in physical sciences

**2. Identify specific issues, not yet discussed, that should be addressed in preparation for the Dec. 2nd meeting.**

*Yogendra Gupta*

- Finding new resources
  - F&A collection must increase dramatically to strengthen research investments
- Waiting for well thought out plan regarding “Scientific Computations” that goes beyond generalities
  - Needs specific outcomes and metrics
- Thank you for leading much-needed emphasis on research
- Specific and realistic metrics needs to be specified
  - How will this study and the implementation of its outcomes lead to a stronger research enterprise?

**3. Please provide any other feedback you may have.**

*Bill Andrefsky*

- Understanding where graduate students go after leaving WSU
  - Graduate School as central repository for this information

*Patricia Butterfield*

- 120 day study has been a quick, inclusive, and forward thinking process

*Yogendra Gupta*

- Scope of study is too broad – focusing only on Research Themes and Research Infrastructure (in that order) may be more beneficial
  - They should be the drivers and guide strategic thinking
  - Other two categories are tactical and operational

*Ron Mittelhammer*

- This is likely a product of the still early stage of the 120 day effort, but we are currently rather long on problem/current situation recognition, and rather short on purposeful action/implementation/future strategies. My point is that I trust the subgroups know that the end game is the latter.

**Bill Andrefsky, Dean, Graduate School**

Comment on 120 Study Executive Review Comments  
October 27, 2014

**1a. Grand Challenge Research Themes.**

I have read about 100 different theme submissions from faculty, administrators, and I believe a student or two. These suggested themes vary on a number of different dimensions; very specific to very general, very detailed to very broad, very disciplinary specific to very interdisciplinary, etc. I believe there is a role for most of this diversity. As we begin selecting our most important challenges it would be wise to select broad or more consuming topics that can encompass several of the more specific or narrow suggestions. In other words, the more focused project or projects can be organized under the larger theme. In doing so I believe we can maintain central themes for a relatively long period of time (better for long-term gestation projects) but continually bring in new ideas in the form of specific research initiatives that are captured under the broad central theme. I would suggest 3-4 broad research themes that fit our institutional mission and that each of these themes have 2-5 specific initiatives with very focused goals with perhaps targeted funding located under each of the broader themes.

For example, a broad theme title might be "The Nexus of Ecosystems and Social Systems." More specific projects under that theme may include topics such as Sustainable Water Resource Projects, Biofuel Production Projects, Harnessing Extreme Environments, etc.

The hierarchical structure of the research themes may also facilitate the need to recognize important initiatives that may not be directly linked to funding sources but which are important for our research mission. For instance, recognition, recruitment and mentoring of under represented minorities in graduate education may be a priority for our institution but such an initiative may not be recognized by all as one of our grand challenges. However, we may find that one of our existing research themes (Biofuel Production for instance) may have an opportunity to fund underrepresented minorities in a STEM education expansion solicitation (AGEP-T solicitation, NRT solicitation). In this way we can be more inclusive of those research initiatives that may not easily be funded as stand along projects but may be funded if wrapped into larger research initiatives-for the benefit of both initiatives.

**1b. Research Infrastructure Bins.**

The use of "bins" as a framework to organize our infrastructure needs is useful. I think it is important to get an accurate inventory of what we currently have in those various bins. At that point I think we can more reasonably gauge our needs and future directions. I think we need a central management system for these infrastructure

components that link the needs of specific kinds of scholarship with the funding that is generated to support the infrastructure. Of course, it is ok to decentralize the location and mix of infrastructure components but I feel that one of our biggest issues is replication of components at different scales. If we had an accurate compilation of and tracking system for our components we could be more efficient. I really think the Office of Research needs to be that central office with infrastructure bins for a variety of reasons-not the least of which relates to proposal development for infrastructure components and recapitalization or maintenance of components with research overhead support. I'm not sure exactly how we could fund or operationalize such a centralized responsibility but I do feel that a discussion about research ICR's needs to take place.

#### 1c. Faculty Productivity.

I'm going to focus my comments on faculty productivity. I have been a department chair for over a decade before moving over to central administration. As a land-grant institution we have many different missions (teaching, outreach, scholarship). WSU is also a Research 1 institution that aspires to AAU invitation. If this is our target then we need to align our metrics on productivity with AAU benchmarks. Regardless of discipline, there are research productivity metrics that contribute to AAU guidelines in all disciplines. In some disciplines those metrics clearly point to extramural funding but other disciplines do not have the same kind of extramural funding opportunities. However, those units can certainly contribute to AAU benchmarks. For instance, national academy membership, elected leadership into disciplinary societies, disciplinary awards at the national and international level, peer review publications, book awards, etc. It is important for each discipline to identify those benchmarks that recognize world-class scholarship in their field.

There are also internal metrics that can help with AAU benchmarks. For instance, some of our graduate degree-granting programs only have 25% of their T/TT faculty engaged with graduate education as student committee chairs. We cannot bring up the number of WSU PhD's granted if we have T/TT faculty who are not participating in graduate education. This must be emphasized by the college deans to the program chairs and directors and reflected in faculty annual review and new faculty hires or even replacement of faculty lines. Number of PhD's granted by this institution is an important AAU benchmark and WSU faculty in T/TT positions in a graduate degree offering unit need to be evaluated upon their effectiveness to meet this benchmark.

As we begin setting metrics for faculty engagement it is important to recognize those units that are central to our research mission and those units central to our teaching mission. Doing so will allow us to not only hire appropriately into our units (why hire T/TT faculty if our unit's responsibility is only to teach introductory history or introductory calculus?), but also allow us to effectively assess our faculty and unit productivity.

### 2/3. Other Issues.

One significant issue that WSU has had over the years is an understanding of where our graduates (masters and doctoral degrees) land after leaving WSU. This kind of information is very important for establishing how much of an impact we have on each of our disciplines that offer graduate education. The graduate school requests this information from each degree-granting program during program review. This is needed for our institutional accreditation as well. I feel that this kind of information should be regularly recorded and maintained by each department, not only because faculty often establish a long-term mentor/student relationship with their graduates which can facilitate gathering such information, but also because this kind of data can only benefit the program as they look toward establishing their records of placement and toward alumni/donor opportunities.

Unfortunately, most degree-granting units do not maintain a listing of their graduates and graduate placement. I think it is important for each college to urge their departments and programs to survey their faculty to record the placement of their graduates for as far back as possible and then to maintain that list as graduate students enter the job market. If those lists are forwarded to the Graduate School during annual reporting for program review, the Graduate School could be a central repository for such listings. I know of at least two university presidents that obtained their graduate degrees from WSU-there may be more, but I have never seen this information announced or listed. This is important information that we have an ability to generate that can only increase our recognition as a leading research institution.



## Patricia Butterfield, Dean, College of Nursing

### Questions for 120-Day Study Executive Review Group- October 22, 2014 Large Group Meeting

1. Comment on overall study progress, including:
  - a. Development of "grand challenge" research themes.

Input: In the context of the WSU's emphasis on health sciences, it seems apropos to link these efforts to a grand challenge. Our land-grant heritage and evolving strengths would wrap well around a broadly framed grand challenge addressing "Transforming health and healthcare to serve all Washingtonians." I really think our lynch pin at WSU (and frankly something that differentiates us from UW is a powerful way) is that we're committed to transforming delivery systems (especially rural and the rural-urban interface) in ways that are proactive, use the healthcare workforce in novel ways, and involves rural communities as full partners in the evolution of clinical care in their home communities.

- b. Definition of Research Infrastructure "bins" and a plan to manage them.

Input: Most of these bins make sense. However some of them seem to be framed in a manner perpetuates a somewhat antiquated (and inaccurate) split between laboratory and clinical (or field or community) level science. To prevent the leftovers from being parked in the bin titled "human subjects," it would be good to reframe the bins to a capture a broader conceptualization of science. Areas where we have research infrastructure needs wrapped around clinical science include: 1) infrastructure for epidemiologic studies, 2) community-based participatory research, and 3) other clinical / translational studies addressing complex topics such as adverse childhood events, drug abuse, healthcare transitions, effectiveness/efficacy research, and research addressing novel models of care in different types of clinical settings (e.g., gerontology, daycare settings, schools, etc.). The research infrastructure needs for these types of research are modest...generally they involve people and paper (i.e., software and systems), but they make all the difference between competitive and non-competitive proposals.

One other in the weeds suggestion is that we may have research infrastructure needs for a deeper bench in GIS and spatial health data. Those skills and personnel are necessary for almost many types of public health research. Their skills (maps) are also important in developing competitive proposals.

- c. Progress toward Identification of key issues and development of findings, recommendations, and metrics for the Faculty and Student Engagement/Productivity and Outreach/Economic Development subgroups.

Input: What was presented today made sense to me. It's the usual cast of characters. I can't emphasize enough the importance of opportunities for spousal/partner accommodation...especially in the recruitment of female faculty. Our profession is in a tough market for talent acquisition....we have not closed on several offers for faculty because fairly late in the game the spouse/partner is not able to relocate to Spokane.

d. Identification of "barriers" to research excellence.

No input at this time.

2. Identify specific issues, not yet discussed, that should be addressed in preparation for the Dec. 2nd meeting.

Provided above.

3. Please provide any other feedback you may have.

This has been an inclusive, quick, and forward thinking process. I know the 120-day time horizon is quick, but it's a great way to assess, reflect, and lay out a roadmap for moving forward. Thanks for your leadership, listening, and action.

### Yogendra Gupta, Director, Institute for Shock Physics

First, my compliments to all the participants in the 120 Day Study. Everyone involved is working hard and making valuable contributions. A wonderful, dedicated group.

#### Question 3

Having attended both meetings, I believe that the scope of the study is too broad. Focusing only on Research Themes and Research Infrastructure (in that order) may have been more beneficial. There is a qualitative difference, at least in my mind, regarding the four groupings.

Research Themes and Research Infrastructure should be the drivers for defining the future aspirations/directions/investments for the WSU Research Enterprise: the stated goal of the study. These two categories should guide the strategic thinking. Getting these two well defined will be a significant achievement.

The latter two categories were more operational and tactical. A lot of information gathering and, in my opinion, not guiding the future as much.

#### Question 1

- a. A difficult challenge and I applaud the sub-group for their thoughtful approach to this challenge. WSU must think broadly, be aspirational, and focus on the future. There needs to be less emphasis on near-term applicability. A University is about aspirations and inspiring young people.
- b. Again, my compliments to the sub-group for their hard work. As I commented on October 22, larger “bins” and strategic thinking is needed. Otherwise, the sub-group will drown in too much information.
- c. Not clear where the other two sub-groups are headed. Too many anecdotal comments and not enough clarity regarding objectives.
- d. Rather than identifying “barriers,” I prefer to comment on needs. WSU research is too focused on applications and the institution needs to strike a better balance regarding fundamental research. **Need to invest in the physical sciences.** At present, WSU is not a comprehensive (or balanced) research university.

#### Question 2

The issue of finding new resources has not been addressed. The F&A collection at WSU must increase dramatically to strengthen research investments.

Still waiting to see a well thought out plan regarding “Scientific Computations” that goes beyond generalities. Specific outcomes and metrics need to be defined.

In summary, I thank the two of you for leading this much-needed emphasis on research. Specific and realistic metrics need to be specified as a part of this study. How will this study and the implementation of its outcome lead to a stronger research enterprise at WSU?

### Tim Kohler, Regents Professor, Archaeology

Overall this is by far the most energetic, impressive attempt to get a handle on WSU's research enterprise that I've seen in my 30+ years here, and in my opinion the research themes subgroup is working hard and effectively to respond to a very difficult assignment. Still, of course I have some suggestions, in no particular order:

1. I don't see this committee making much use of the suggestions gathered on-line. Recently I participated in a national process to identify "grand challenges for archaeology" for the next 25 years (results just published in PNAS) and we started out with crowd-sourced suggestions which we attempted to categorize into general areas, and we used these, in addition to suggestions from the invited participants, as the first cut at our grand challenges; some eventually got winnowed to keep the list manageable. So far as I can tell committee members are instead starting from other sources, which aren't clear; they seem to have read the crowd-sourced materials but not really engaged with them. I suspect that is true for the materials they recently received from the Colleges as well, though those materials weren't shared with the members of the executive review group attending.

2. The committee seems to be quickly coalescing around a few not-very surprising themes including health, water, and energy. These do either correspond to WSU's historic strengths (or in the case of health, an aspirational strength) or intersect in some way with our land-grant status. I worry about "premature convergence" though; isn't it getting the cart before the horse to determine themes before seriously considering the crowd-sourced and college-generated inputs?

3. The themes so far identified have dimensions of interest for scholars here who study the past, and think about the future, that are not adequately developed (or even acknowledged). It seems to me that knowledge of the past health status of populations is essential for any real understanding of current health (similar remarks could be made about water and energy. It is a famous tenet in anthropology that "culture advances as energy captured per person increases"). What are the implications for the future of WSU research in any of these areas? This is analogous to the problem identified by the committee as to "what do do with data science": should it be a stand-alone area, or a necessary dimension of each of the other areas? I think the committee is leaning towards the latter approach (I agree); in much the same way much broader temporal perspectives should be cultivated for each of the themes that are finally chosen for development.

4. There's also a problem with what I'll call "small science" that I'm not sure what to do with. We have small pockets of excellence at WSU (I'll not be shy and acknowledge that archaeology is one of the few areas in which we can legitimately claim to have a top-10 national program) but these are likely not sufficiently big or well-funded to merit identification among WSU's grand research themes. Yet a university with so few top-10

programs can hardly afford not to capitalize and support those areas in which it is excellent. Is there a way to acknowledge this within this exercise?

**Ron Mittelhammer, Dean, College of Agricultural, Human, and Natural Resource Sciences**

120 Day Study Follow-up Comments

- **Research Infrastructure Subgroup**
  - We are moving from a decentralized to a more centralized system. The broad-sweeping approach taken by this subgroup appears to be almost necessary for creating an initial inventory. But as part of the work of the subgroup, we need to ask them to devise a more directed process with a more strategic and centralized set of objectives for updating the relevant infrastructure inventory next time. The scope of relevant inventory needs and the purpose of that inventory can be clarified.
  - What principles or rationale is being followed in defining the bin categories (now 17)?
  - Should we be categorizing by potential use by various disciplines as well as by function of the equipment/facility/infrastructure? As we move towards more centralized core-facilities, it will be important to identify what cores service what disciplines effectively.
  
- **Research Themes Subgroup**
  - Environmental themes could be better represented on the committee. Someone from CEREO or SoE (in addition to Water and Yoder)?
  - What are the societal, industry, welfare, and economic development issues that we are targeting by research theme definitions? It would be helpful to have clearer rationale/connections, and these must mesh with WSU's strengths and capabilities.
  - What overall criteria are being used to inform the definition of research themes? These need to be articulated.
  
- **Faculty and Student Engagement/Productivity Subgroup**
  - We need to articulate how we can raise the level of program quality to a given high standard uniformly while also strategically investing/promoting pockets of true excellence/preeminence.
  - We need to jettison, once and for all, any lingering culture that suggests that we can be all things to all people, and that all current activities and efforts can continue to be supported in an egalitarian way.
  - Group produced a recommendation summary that effectively inventories the gamut of activities and functions that need to drive any aspiring

# Executive Review Group Comments on the 120 Day Study

December, 2014



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## Summary of Comments

### Question 1: Comment on overall study progress, including:

- a. **Development of "grand challenge" research themes as well as identifying and prioritizing research strengths.**

*Renny Christopher*

- Process somewhat chaotic to date
- Unevenness across colleges about ways/timelines that information on current research areas/strengths has been collected
- Need clear communication regarding purpose and intent of defining focus areas
  - Address faculty concerns regarding working in the focus areas
- Lack of discussion regarding medical school's role

*Yogendra Gupta*

- Research Themes subgroup is most useful in defining future research direction
- Concerned about emphasis on "Grand Challenges" and how they are being defined in this study
- National security should be one of key research themes

*Mike Trevisan*

- Asking that STEM education research be given serious consideration as a WSU research theme
- Based on input from inventory committee we know:
  - 126 faculty involved in some type of STEM education research
  - 9 special units that deal with STEM education research
  - 29 significant collaborations among faculty
- Based on OGRD data from 2010-2014 on grant projects focused on STEM education research we know:
  - Total award amount for this 5-year period is \$46,565,598
    - An average of \$9,313,119 per year
  - Currently \$14,168,954 in pending grants
- STEM education research is clear priority among faculty.
- Focusing effort and resources would be strategic investment
  - Peer institutions with AAU status have done it
- STEM education research pulls together the university like no other theme

- b. **Research Infrastructure management recommendation on "Bins" or Focused Infrastructure Groups (FIG), through the use of a University Infrastructure Committee (UIC).**

*Renny Christopher*

- Use of “bins” and groups reporting to UIC is good organization
  - Keeps issues active and campus-wide rather than limited to colleges, departments, or institutes/centers
  - Not fond of FIG, but name is not a big deal
- c. **Progress toward Identification of key issues and development of findings, recommendations, and metrics for the Faculty and Student Engagement/Productivity and Outreach/Economic Development subgroups.**
- d. **Identification of "barriers" to research excellence.**

**Question 2: Identify any outstanding specific issues that have not yet been discussed.**

*Renny Christopher*

- Many Vancouver faculty feel in the dark regarding purpose, goals, progress, and process of this enterprise
  - Have expressed a great deal of confusion
- Good communication will be important in new year.

*Yogendra Gupta*

- Key benefit of 120 day study is the raised profile of “research” at WSU
- Scope is too broad
  - Research themes and research infrastructure should have been focus
- Research themes group is always at end of meetings with least amount of time
- Outreach, Engagement, and Economic Development is weakest subgroup
  - Co-chairs provide too many details and are unable to synthesize and prioritize outcomes
- Make sure any “individual creativity” is not compromised to implement a top-down, multidisciplinary research vision
  - Individual creativity is what separates a university from other organizations

**Question 3: Please provide any other feedback you may have.**

*Yogendra Gupta*

- If research at WSU is going to grow measurably in quality and quantity, academic side (Provost, Deans, Departments) has to take lead with Office of Research providing support
- Steps for academic side:

- Have deans who are strongly committed to research and scholarship. Research productivity of a College should be an important metric in evaluating the performance of Deans.
- Raise tenure and promotion standards across the institution. Tenure (essentially a life-time employment) should be granted only when there is strong evidence of research and scholarship.
- Establish clear metrics for research success, as appropriate for a given field. One size does not fit all.
- Reward research success so that you send a clear message about WSU values.
- Invest in the upcoming and younger faculty.
- Steps for research side:
  - The VPR (and the Office of Research) should be provided the resources that are commensurate for a major research university.
  - The Office of Research needs to be reviewed on a regular basis by a committee (made up of strong research faculty) to assess its usefulness for strengthening research at WSU.
  - The Office of Research needs some fresh thinking and personnel changes as appropriate to prepare for the future. Status-quo does not suffice in a competitive research environment and the same philosophy should hold for the Office of Research.

**Renny Christopher, Vice Chancellor for Academic Affairs, WSU Vancouver**

Questions for 120-Day Study Executive Review Group- December 2, 2014 Large Group Meeting

**1. Comment on overall study progress, including:**

**a. Development of "grand challenge" research themes as well as identifying and prioritizing research strengths.**

RC comments: The process seems to have been a bit chaotic to date, but we have an interesting panoply of suggestions. I have found in talking with Vancouver faculty that there has been unevenness across colleges about the ways/timelines in which information regarding current research areas/strengths has been collected. One question that faculty ask a lot is whether faculty not working in focus areas will be "thrown under the bus," (the exact words of a faculty member to me just yesterday). I try to reassure them that this is not the case, but I think clear communication regarding the purpose and intent of defining these areas is needed going forward. Also, the elephant that seemed not to appear in the room during this part of the discussion at the last meeting is the anticipated role to be played by the medical school.

**b. Research Infrastructure management recommendation on "Bins" or Focused Infrastructure Groups (FIG), through the use of a University Infrastructure Committee (UIC).**

RC Comments: I think the use of "bins" and the associated groups reporting up to a UIC is a good way to organize (and I'm not fond of FIG—I think bin is fine—but I also don't think the name is a big deal.) It keeps the issues active and campus-wide, rather than limited to depts., colleges, or institutes/centers.

**c. Progress toward Identification of key issues and development of findings, recommendations, and metrics for the Faculty and Student Engagement/Productivity and Outreach/Economic Development subgroups.**

**d. Identification of "barriers" to research excellence.**

**2. Identify any outstanding specific issues that have not yet been discussed.**

RC Comments: I think that many Vancouver faculty feel largely in the dark about the purpose, goals, progress, and process of this enterprise—I don't know how Pullman faculty may vary in this, but Vancouver faculty have expressed a good deal of confusion. Therefore I think good communication in the new year will be very important.

**3. Please provide any other feedback you may have.**

## **Yogendra Gupta, Director, Institute for Shock Physics**

My feedback is in two parts: 120 day study and broader research issues. First, a very brief preamble.

My coming to WSU in 1981 and staying here since then is entirely due to my strong interest in: research and graduate education, and the intellectual freedom that an academic setting provides. The comments below are governed by my desire to see WSU excel in research and graduate education. I have no other agenda.

### **A. 120 Day Study**

As I wrote in my earlier email (10/31/2014), a key benefit of the 120 day study (with you as co-chairs) is that it has raised the profile of “research” at WSU. WSU must view itself as a research university that wants to be a player on the national stage. Anything less is not acceptable to me.

While the study seems to be progressing reasonably well, the scope is too broad. Research themes and research infrastructure should have been the focus. Not sure why the meeting agendas are structured so that the most important element (Research Themes) is always at the end and has the least amount of time.

The Outreach, Engagement, and Economic Development is the weakest subgroup. The Co-Chairs provide too many details (impossible to comprehend) and are unable to synthesize and prioritize the outcomes. Brevity and focus are missing in the presentations.

The Research Themes subgroup has the most difficult job. My compliments to Don Bender for taking on an “impossible assignment” and for his thoughtful approach and his emphasis on brevity. To me this is the most useful subgroup in defining the future research direction. Although Chris has seen the same, I am attaching the first page of what I wrote to Don Bender on the 10<sup>th</sup>. Frankly, I am concerned about the emphasis on “Grand Challenges” and how they are being defined in this study.

Let me close this part by making two comments: National Security should be one of the key research themes; and irrespective of the outcome of the 120 day study, please make sure that the “individual creativity” is not compromised to implement a top down, multidisciplinary research vision. Individual creativity is what separates a university from other organizations.

Some of the other questions are addressed in the next part.

### **B. Research at WSU**

If research at WSU is going to grow measurably in quality and quantity, the academic side of WSU (Provost, Deans, Departments) has to take the lead with the Office of Research providing the appropriate support. After all, it is the faculty members who do the research, publish papers, and bring the funds. Specific steps for the academic side:

1. Have Deans who are strongly committed to research and scholarship. Research productivity of a College should be an important metric in evaluating the performance of Deans.
2. Raise tenure and promotion standards across the institution. Tenure (essentially a life-time employment) should be granted only when there is strong evidence of research and scholarship.
3. Establish clear metrics for research success, as appropriate for a given field. One size does not fit all.
4. Reward research success so that you send a clear message about WSU values.
5. Invest in the upcoming and younger faculty.

Specific steps for the research side:

1. The VPR (and the Office of Research) should be provided the resources that are commensurate for a major research university.
2. The Office of Research needs to be reviewed on a regular basis by a committee (made up of strong research faculty) to assess its usefulness for strengthening research at WSU.
3. The Office of Research needs some fresh thinking and personnel changes as appropriate to prepare for the future. Status-quo does not suffice in a competitive research environment and the same philosophy should hold for the Office of Research.

Hope the above comments are of some use. Use them or discard them as you see fit. My feelings will not be hurt. Please excuse my straightforwardness.

**Yogendra Gupta, Director, Institute for Shock Physics**

Email to Don Bender, 12/10/2014

Hello Don,

I am writing this note to express my sincere thanks to you and to compliment you for your thoughtful approach and leadership regarding an impossible assignment. Below I express some thoughts/observations based on my 33 plus years as a WSU faculty member. For transparency, I am copying Chris Keane on this email.

As I have stated publicly, the strength of the U.S. university system is the intellectual freedom afforded to a faculty member and, as such, the individual creativity is the most valuable intellectual asset that the university possesses. Everything else flows from this creativity. The “bottom up” approach to academic research is unique to the U.S. higher education system and remains its single biggest strength. Although the university only provides a 9 month salary to its faculty, the freedom and the opportunity to pursue one’s passion is why I consider it to be the best job.

The role of the university administration must be to nurture the individual creativity, and only-when-it-makes-sense help grow multidisciplinary enterprises. Strong multidisciplinary enterprises require excellent partners who share a common passion (and don’t just come together for money). Broadly speaking, the university administration should create an atmosphere that encourages outstanding research and creativity, rewards success, and helps faculty pursue new frontiers and opportunities (when it makes sense). The university administration should not try to pick future “winners” or create a centralized system of making decisions about specific research topics.

It is my hope, and request, that your subgroup recommendations emphasize the importance of encouraging and nurturing individual creativity, and will suggest potentially important research themes for the future, based on new and exciting opportunities. Speaking only for myself, I do not like the term “Grand Challenges”. It is an extremely over-used phrase that is a staple of Washington, DC bureaucracy and is commonly used by the national laboratories to garner funding for large projects. I am uncomfortable with the continued use of the UCLA Grand Challenge example (something about hot climate in LA) in the context of the 120 day study. While it may be a useful societal need for LA, it is certainly not a grand challenge in an intellectual sense. Also, the requirements listed for labeling something as a Grand Challenge in the 120 day study: inspirational, multidisciplinary, and inclusive appear to be overly restrictive. By the latter two requirements, most of the great scientific breakthroughs in the last 100 years would have never made it as Grand Challenges.

It is my hope that your committee can come up with some broad and important themes that WSU research should contribute to in the future. I believe that National Security should be one of the research themes that WSU should encourage in its future aspirations. After all, the most important function of the Federal Government is safeguarding its citizens. Hence, national security research will always be important at the national level.



**Mike Trevisan, Dean, College of Education**

I am responding here to the themes question only. As a side, I will have the STEM education research inventory data to you Dan, first thing in the morning. Summary data are compelling. Based on input from the inventory subcommittee, we know the following:

1. There are 126 faculty involved with some type of STEM education research across the institution.
2. There are 9 special units that deal with STEM education research.
3. There are 29 significant collaborations among faculty.

In addition, we asked OGRD to pull grant funded projects focused on STEM education research from the grants database from 2010 - 2014. The total award amount for this 5-year period is \$46,565,598. This is an average of \$9,313,119 per year in STEM education research funding. In addition, there is currently \$14,168,954 in pending grants focused on STEM education research.

STEM education research at WSU is a clear priority among faculty. I argue that focusing some effort and resources on STEM education research, as do some of our peer institutions with AAU status (e.g., ISU, MSU) would be a strategic investment. I think STEM education research likely pulls together the institution in a way that no other theme does.

I ask that STEM education research be given serious consideration as a WSU research theme.

Thank you for the opportunity to respond.

university, and underscore what I would think are reasonably well known. What are the priorities for these at WSU? Where is additional emphasis needed?

- **Outreach, Engagement, and Economic Development Subgroup**
  - Inventory of “things to do”, and associated conclusions make sense, but underscore issues that were pretty much known. We need to consider action steps/procedures/processes that will actually implement the recommendations that were listed.
  - Example – chairs are generally oversubscribed and might not be the “go to” people to ensure awards are pursued. In fact, we have ample evidence that this is the case. Do we need a more formalized award nomination policy/process? More centralized approach? Supported with additional resources, or provided more recognition/reward in the expectation/review of the “service component” of one’s responsibilities? What would that be?
  
- **Overall Comment**
  - This is likely a product of the still early stage of the 120 day effort, but we are currently rather long on problem/current situation recognition, and rather short on purposeful action/implementation/future strategies. My point is that I trust the subgroups know that the end game is the latter.

## **APPENDIX E**

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### **WSU RESEARCH OVERVIEW DOCUMENTS**

WSU RESEARCH HISTORY TIMELINE

ADDITIONAL RESEARCH STATISTICS

SAMPLE OF FY14 GRANTS AWARDED

## WSU RESEARCH HISTORY TIMELINE 1890-2010

- 1890** Washington Land-Grant College established by the State Legislature, based on 1862 federal Morrill Act signed by President Abraham Lincoln. Washington received 90,000 acres of federal land to support its agricultural college and 100,000 acres to support its school of science.
- 1891** Pullman selected as the site of the new college and George Lilley appointed first president.
- 1892** Washington Agricultural College, Experiment Station and School of Science opens its doors with 13 collegiate and 46 preparatory students. Instruction began in agriculture, mechanic arts and engineering, and sciences and arts.
- 1892** John W. Heston, principal of Seattle High School, appointed president.
- 1893** E.A. Bryan appointed president. The former president of Vincennes University in Indiana, he had graduate degrees from Harvard and Columbia.
- 1894** 6<sup>th</sup> faculty member William Jasper Spillman arrives to serve as WSU's first wheat breeder. WSU's first wheat breeder from 1894 to 1902, Spillman was the only American to independently rediscover Mendel's Law of Heredity. He was also influential in early agricultural economics.  
Agricultural research starts in Puyallup, Western Washington
- 1906** Enrollment more than triples from 481 in 1899 to 1,371 in 1906.
- 1914-1918 – World War I** impacted State College, with units of soldiers training on campus. 41 soldiers died of influenza epidemic.
- 1915** – President Ernest O. Holland, former Superintendent of Schools in Louisville, KY, appointed.
- 1917** – Under the leadership of President Holland, WSU established five colleges and four schools. Colleges: Agriculture, Mechanical Arts and Engineering, Science and Arts, Veterinary, Home Economics. Schools: Mines, Education, Pharmacy, and Music and Applied Design. Graduate School is also created. Enrollment 2,130
- 1922** The Graduate School was formally organized. Graduate degrees would become more defined and recruitment of highly qualified students for the advanced degrees in the current and new programs would be increased. The faculty Research Council was formed to encourage faculty and student research. First PhD degree (Bacteriology) conferred in 1929.
- 1930's Great Depression** - The Great Depression severely impacts WSU, with faculty and staff taking an average 25 percent cut in salary during 1931-1933.
- 1940** School of Business Administration created, separating from the College of Sciences and Arts. WSU enrollment 5,109.
- 1939-1945 World War 2**
- 1941** Federal government recruited faculty members for U.S. Defense service  
Plans approved for Engineering Lab Building and Veterinary Medicine Classroom and Laboratory Building
- 1942** Department of Nursing Education established
- 1944** Research led to the development of "Cougar Gold Cheese," produced by WSU Creamery.
- 1945** **Vannevar Bush influential report "Science – the Endless Frontier"** influences establishment of Federal Agencies to fund basic research at universities  
Establishment of Institutes of Technology and Agriculture at WSU
- 1946** President Wilson Compton appointed – Ph.D. from Princeton and former VP and Manager of American Forest Products Industries, Inc.)

### **U.S. National Institute of Health – significant expansion of Grants Program**

- 1948** Construction begins on Todd Hall. Enrollment 7,890
- 1949** Construction begins on Holland Library
- 1950** **U.S. National Science Foundation established**
- 1952** C. Clement French assumes presidency. Dr. French obtained his Ph.D. from University of Pennsylvania and was formerly Dean of Faculty at Texas A&M.
- 1955** Poultry scientists Leo Jensen and Igor Kosin developed hatch process, which will return a \$9,000,000 annual savings to turkey producers.
- 1958** **Kennedy era – Beginning of the Race to Space** accelerated government investment in academic research and scholarships and increased investment in new fields like aerospace engineers, electronic engineers, new materials, new energy sources...)
- 1958** NSF grant of \$300,000 assured the building of a nuclear reactor on campus
- 1959** Washington State College becomes Washington State University
- 1961** WSU's Nuclear Radiation Center's [MWTRIGA](#) Conversion reactor was built. Part of [President Eisenhower's Atoms for Peace](#) initiative, the reactor is a potent research tool [radiochemistry](#) graduate program and is one of few remaining Nuclear Research Reactors in the country.
- 1962** President French and Regent Tom Gose visited WSU program in Pakistan, one of the first international programs helping developing countries with land grant-type assistance.
- 1963** Radiocarbon dating laboratory established in College of Engineering
- 1965** WSU and UW establish the State of Washington Water Research Center on the WSU Pullman campus.
- 1967** R.A. Nilan, geneticist, develops new barley strain with chemical mutagen.
- 1967** W. Glenn Terrell named 7th WSU president. He holds a Ph.D. from the University of Iowa and is Dean of Faculties, University of Illinois at Chicago Circle.
- 1969** Enrollment 13,128.
- 1971** WSU geologist, Roald Fryxell, chosen to examine lunar rocks in Houston.
- 1973** Edward R. Murrow Communication Center is dedicated.
- 1974** Washington, Oregon, Idaho regional Veterinary Medicine Program started, led by WSU Veterinary College.
- 1976** Kellogg Foundation created Partnership for Rural Improvement at WSU with \$1,000,000 grant .
- 1976** U.S. President Ford presented Orville Vogel, WSU and USDA researcher, with National Medal of Science. Regent Professor Orville Vogel, developed the world's most productive wheat strains.
- 1980** **Bayh-Dole Act** (Patent and Trademark Amendments of 1980) provides a framework for innovation at universities across the country.
- 1985** Samuel H. Smith named 8<sup>th</sup> WSU President. He holds degrees in plant pathology from UC Berkeley and was Dean of the College of Agriculture at Penn State University.
- 1986** WSU Biochemist Clarence A. "Bud" Ryan is the first WSU professor selected for membership in the prestigious National Academy of Sciences
- 1989** WSU established regional WSU campuses in Spokane, the Tri-Cities, and Vancouver.
- 1990** Plans approved for SIRTI, Spokane Intercollegiate Research and Technology Institute (SIRTI) plans.

- 1990-7** WSU Foundation's first comprehensive fundraising campaign raised more than \$275 million. It increased the WSU's scholarship endowment, established endowed professorships to attract and retain top research faculty, and provided modern equipment for teaching and research.
- 1991** Dedication of WSU Tri-Cities new \$12.7 million teaching facility in Richland.  
WSU ranked 34<sup>th</sup> nationally in corporate financial support.
- 1992** Doctor of Pharmacy program approved for WSU Spokane.  
The space shuttle Columbia carried an experiment by WSU physicist Philip Marston.
- 1993** R. James Cook, USDA plant pathologist and WSU adjunct professor, selected for National Academy of Sciences.  
WSU researchers sent a plant experiment up with the space shuttle Discovery.
- 1996** WSU's Vancouver campus is dedicated.
- 1997** WSU biochemists Rod Croteau and Linda Randall were elected to the National Academic of Sciences. They joined four other WSU researchers in the academy, C.A. "Bud" Ryan, a biochemist; Jim Cook, a USDA plant pathologist at WSU, John Hirth, a materials scientist, and Dieter H. Von Wettstein, a plant geneticist.  
WSU received \$10 million, five-year grant from the U.S. Department of Energy to create an Institute for Shock Physics. The institute is directed by WSU physics Professor Yogi Gupta.
- 1998** - Engineering, Teaching and Research Laboratory opened. The new \$27 million, 100,000-square foot, the four-story building, next to Dana Hall, was funded by the U.S. Department of Energy.  
A new state law gave WSU a major educational leadership role in Spokane, and management responsibilities for the Riverpoint campus. WSU enrollment is 17,912.
- 2000** – V. Lane Rawlins becomes WSU's ninth president. Previously president of the University of Memphis, he is a former WSU economics faculty member and had served as WSU's vice provost from 1982-86.
- 2001** – Enrollment 21,794
- 2003** - U.S. News and World Report ranked WSU in the top 50 public research institutions in the nation.  
Anjan Bose, College of Engineering and Architecture dean, and Jim Asay of the Institute for Shock Physics, were named to the National Academy of Engineering.
- 2004** - A test developed at WSU was used to diagnose the nation's first case of "mad cow" disease. Credited were researchers from the U.S. Department of Agriculture's Agricultural Research Service at WSU and from WSU's Department of Veterinary Microbiology and Pathology. The USDA chose WSU for one of seven laboratories nationwide to conduct tests for the disease.
- 2005** – Yardley Report and GEC report commissioned to strategically assess WSU doctoral programs.  
Dedicated the Plant Biosciences Building, the first of several new buildings that will create a new research and education complex along Stadium Way, and the new Education.  
Work by WSU molecular biologist Michael K. Skinner and his research team is chosen as one of the top 100 science stories of 2005, by *Discover Magazine*. The researchers found that exposing fetal rats to environmental toxins can affect their sexual development in a way that shows up in subsequent generations as well.
- 2006** - Elson S. Floyd named tenth president of WSU. Former president of the University of Missouri, Dr. Floyd was also formerly President of Western Michigan University and an administrator at his alma mater, the University of North Carolina Chapel Hill.

Dr. Guy Palmer, a veterinary pathologist at WSU's College of Veterinary Medicine, elected to membership in the National Academy of Science's Institute of Medicine.

The new Carnegie Classifications ranked WSU as one of 96 public and private research institutions nationwide with very high research activity.

**2007** –WSU Plant Sciences faculty ranked at No. 2, animal sciences faculty at No. 4, and food science faculty at No. 6 by Academic Analytics' 2007 *Faculty Scholarly Productivity Index*.

National Science Foundation R&D expenditures ranks WSU at 22nd among public research universities, without a medical school; at 57<sup>th</sup> among all public research institutions and 82<sup>nd</sup> among all research institutions, public and private. ([National Science Foundation, Science Resources Statistics, Data Tables](#))

A WSU team of physicists completed the first experiments using the nation's premiere synchrotron X-ray facility to detect shock wave-induced changes in a crystalline material.

**Nation-wide financial crisis** hails the beginning of what became a world-wide recession.

Unemployment rises to 10% by 2009, housing prices fall 30% from 2006 to 2009. Stock market prices 57% from 2007 to 2009.

**2008** –\$25 million gift from the Bill & Melinda Gates Foundation to create the new WSU School for Global Animal Health to address global infectious disease challenges by detecting diseases within animal populations and controlling their transmission.

WSU reproductive biologist Patricia A. Hunt named one of the top 50 researchers in the world by *Scientific American*. Her research shows a potential threat to human health posed by bisphenol A (BPA), a component of the polycarbonate plastics used to make food and beverage containers.

WSU receives nearly \$156 million in new research grant awards during the 2007-08 fiscal year, up about 16 percent from the previous year.

**2009-2011 Washington state's five universities suffer** over 50% cut in state funding. WSU loses approximately 30 percent of its operating budget as allocated by the Legislature. The reductions have been devastating for the university threatening both excellence and access throughout the multi-campus system.

**2009 American Recovery and Reinvestment Act (ARRA)** was signed into law. The ARRA was an economic stimulus package designed to cushion the greatest economic crisis since the Great Depression and lay a new foundation for economic growth.

For the 20th annual Festival of Contemporary Art Music, WSU Music faculty member Charles Argersinger, FoCAM's founding director, was guest composer.

**2010** - Paul G. Allen announced a *gift* of \$26 million to build the Paul G. Allen School of Global Health.

WSU is ranked 10th among national universities by a prominent sustainability website for its developments in [clean technology](#).

Faculty members Thomas Besser, School for Global Animal Health; Don Dillman, Department of Sociology and Community and Rural Sociology; and B.W. Poovaiah, Department of Horticulture; have been elected to the Washington State Academy of Sciences.

In the midst of a lingering economic downturn and despite continuing reductions in state funding, WSU faculty and researchers have achieved more than a 40 percent increase in the amount of outside research and other grant funding awarded the university over the past two fiscal years.

WSU History by the Decade website: <http://university-relations.wsu.edu/WSU-history/>

## WSU RESEARCH SNAPSHOT

Item	Latest Avail. Data	Latest Figures	Year Prior Figures
<b>VPR Webpage and Annual Report</b>			
NSF R&D + Public Service Expenditures	FY14	\$396,770,680	\$395,838,518
<b>NSF HERD Information</b>			
NSF HERD Report R&D Expenditures	FY13	\$341,082,000	\$335,930,000
Per Latest Tenure/Tenure Track Faculty	FY13	\$369,136	\$363,560
NSF HERD Report Federal R&D Expenditures	FY13	\$134,329,000	\$129,255,000
Per Latest Tenure/Tenure Track Faculty	FY13	\$145,378	\$139,886
NSF HERD Report R&D Expenditure National Rank	FY13	68	68
NSF HERD Report Federal R&D Expenditure National Rank	FY13	85	88
<b>Internal WSU Grant/Contract Expenditures</b>			
Sponsored Program Services Net Expenditures	FY14	\$195,574,787	\$204,016,047
Sponsored Program Services Net Federal Expenditures	FY14	\$125,417,112	\$131,006,526
Percent F&A of Direct Costs (On Campus Research Rate = 51%)	FY14	17.4%	17.0%
<b>Proposal Information</b>			
Proposals Submitted	FY14	2,822 totaling \$861,969,885	2,590 totaling \$589,501,031
Average Proposal size Per Latest Tenure/Tenure Track Faculty	FY14	\$932,867	\$641,459
Percent of Proposals that are Multidisciplinary	FY14	19.1%	17.2%
<b>Award and Subcontract Information</b>			
Awards received	FY14	1,727 totaling \$211,282,616	1,702 totaling \$182,291,904
Average Award size Per Latest Tenure/Tenure Track Faculty	FY14	\$228,661	\$198,358
Federal Awards received	FY14	683 totaling \$125,512,566	679 totaling \$117,625,033
Average Federal Award size Per Latest Tenure/Tenure Track Faculty	FY14	\$135,836	\$127,992
Top Federal Sponsors (including flow-through funding)	FY14	USDA \$38,794,517 HHS \$30,847,104 NSF \$23,554,239 DOE \$19,930,635 ED \$19,603,194 DOD \$7,679,189	USDA \$36,760,015 HHS \$24,984,089 NSF \$19,462,027 DOE \$16,727,477 ED \$11,559,615 DOD \$10,422,654
Sponsored Research New Outgoing Subcontracts	FY14	134	135
<b>World Rankings Information</b>			
Academic Ranking of World Universities (Shanghai University) World Ranking	2014	201-300	201-300
The Times Higher Education World University World Ranking	2014-2015	351-400	301-350
National Taiwan University Ranking	2014	315	289



CWTS Leiden Ranking	2014	380	271
QS World University World Ranking	2014	379	366
US News and World Report Global Universities Ranking	2015	325	N/A
US News and World Report National Ranking	2015	138	125
<b>Misc. AAU and Other Indicators</b>			
National Academy Members	2013	9	9
Significant Faculty Awards	2013	9	6
Doctorates Awarded	2013	203	197
Postdoc Appointees	2013	184	194
Tenure/Tenure Track Faculty (who were primarily instruction, primary research, and instruction combined with research/public service)	2012	924	919

### *SOURCES*

Item	Source
NSF R&D + Public Service Expenditures	IR/James Downes
NSF HERD Report R&D Expenditures Per Tenure/Tenure Track Faculty	<a href="http://www.nsf.gov/statistics/srvyherd/">http://www.nsf.gov/statistics/srvyherd/</a> <a href="http://www.nsf.gov/statistics/srvyherd/">http://www.nsf.gov/statistics/srvyherd/</a> and <a href="http://nces.ed.gov/ipeds/datacenter/">http://nces.ed.gov/ipeds/datacenter/</a>
NSF HERD Report Federal R&D Expenditures Per Tenure/Tenure Track Faculty	<a href="http://www.nsf.gov/statistics/srvyherd/">http://www.nsf.gov/statistics/srvyherd/</a> <a href="http://www.nsf.gov/statistics/srvyherd/">http://www.nsf.gov/statistics/srvyherd/</a> and <a href="http://nces.ed.gov/ipeds/datacenter/">http://nces.ed.gov/ipeds/datacenter/</a>
NSF HERD Report R&D Expenditure National Rank	<a href="http://www.nsf.gov/statistics/srvyherd/">http://www.nsf.gov/statistics/srvyherd/</a>
NSF HERD Report Federal R&D Expenditure National Rank	<a href="http://www.nsf.gov/statistics/srvyherd/">http://www.nsf.gov/statistics/srvyherd/</a>
Sponsored Program Services Net Expenditures	<a href="http://sps.wsu.edu/Expenditures.html">http://sps.wsu.edu/Expenditures.html</a>
Sponsored Program Services Net Federal Expenditures	<a href="http://sps.wsu.edu/Expenditures.html">http://sps.wsu.edu/Expenditures.html</a>
Percent F&A of Direct Costs	<a href="http://sps.wsu.edu/Expenditures.html">http://sps.wsu.edu/Expenditures.html</a>
Proposals Submitted	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a>
Average Proposal size per Tenure/Tenure Track Faculty	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a> and <a href="http://nces.ed.gov/ipeds/datacenter/">http://nces.ed.gov/ipeds/datacenter/</a>
Percent of Proposals that are Multidisciplinary Awards received	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a> <a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a>
Average Award size per Tenure/Tenure Track Faculty	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a> and <a href="http://nces.ed.gov/ipeds/datacenter/">http://nces.ed.gov/ipeds/datacenter/</a>
Federal Awards received	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a>
Average Federal Award size per Tenure/Tenure Track Faculty	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a> and <a href="http://nces.ed.gov/ipeds/datacenter/">http://nces.ed.gov/ipeds/datacenter/</a>
Top Federal Sponsors (including flow-through funding)	<a href="https://myresearch.wsu.edu">https://myresearch.wsu.edu</a>
Sponsored Research New Outgoing Subcontracts	SPS provides data via email
Academic Ranking of World Universities (Shanghai University) World Ranking	<a href="http://www.shanghairanking.com/">http://www.shanghairanking.com/</a>
The Times Higher Education World University World Ranking	<a href="http://www.timeshighereducation.co.uk/world-university-rankings/">http://www.timeshighereducation.co.uk/world-university-rankings/</a>
National Taiwan University Ranking	<a href="http://nturanking.lis.ntu.edu.tw/Default-TW.aspx">http://nturanking.lis.ntu.edu.tw/Default-TW.aspx</a>
CWTS Leiden Ranking	<a href="http://www.leidenranking.com/ranking">http://www.leidenranking.com/ranking</a>
QS World University World Ranking	<a href="http://www.topuniversities.com/university-rankings">http://www.topuniversities.com/university-rankings</a>

<b>US News and World Report Global Universities Ranking</b>	<a href="http://www.usnews.com/education/best-global-universities/washington-state-university-236939">http://www.usnews.com/education/best-global-universities/washington-state-university-236939</a>
<b>US News and World Report National Ranking</b>	<a href="http://colleges.usnews.rankingsandreviews.com/best-colleges/washington-state-university-3800">http://colleges.usnews.rankingsandreviews.com/best-colleges/washington-state-university-3800</a>
<b>National Academy Members</b>	<a href="http://mup.asu.edu/">http://mup.asu.edu/</a>
<b>Significant Faculty Awards</b>	<a href="http://mup.asu.edu/">http://mup.asu.edu/</a>
<b>Doctorates Awarded</b>	<a href="http://mup.asu.edu/">http://mup.asu.edu/</a>
<b>Postdoc Appointees</b>	<a href="http://mup.asu.edu/">http://mup.asu.edu/</a>
<b>Tenure/Tenure Track Faculty (who were primarily instruction, primary research, and instruction combined with research/public service)</b>	<a href="http://nces.ed.gov/ipeds/datacenter/">http://nces.ed.gov/ipeds/datacenter/</a>

## SAMPLING OF TOP NEW GRANT AWARDS PER COLLEGE (FY14)

Fiscal Responsible Unit	Contact/Lead PI Name	Title	Agency	Estimated Award Total
<b>AGRICULTURAL RESEARCH CENTER</b>				
ENTOMOLOGY (D)	Snyder, William	BAN PestS: Biodiversity and Natural Pest Suppression	USDA	\$749,661
WSU PROSSER IAREC (D)	Karkee, Manoj	Human-machine collaboration for automated harvesting of tree fruit	USDA, AFRI	\$548,735
BIOLOGICAL SYSTEMS ENGINEERING (D)	Tang, Juming	Determining and Improving the Energy Intensity of Microwave Sterilization and Pasteurization Technologies	DOE	\$498,525
CROP AND SOIL SCIENCES (D)	Gill, Kulvinder	BHEARD Program Bangladesh	MI ST UNIV, BHEARD, USAID	\$473,456
ANIMAL SCIENCES (D)	Jiang, Zhihua	Standardized Next Generation Transcriptome Profiling Tools for X. Tropicalis	HHS, NICHD	\$401,553
CTR FOR SUSTAINING AG-NAT RES (D)	Frear, Craig	Integrated Management of Animal Manure Wastes: Nutrient Recovery, Bio-fertilizers, Enhanced Biomethane Production, and Management Tools	WATER ENVIR RES FDN, EPA	\$253,004
WSU WENATCHEE TFREC (D)	Beers, Elizabeth	Spotted wing drosophila management in sweet cherries	WA AG, Specialty Crop BG, USDA	\$237,908
WSU PROSSER IAREC (D)	Grove, Gary G	Full Season Management of Powdery Mildew of Sweet Cherries	WA AG, Specialty Crop BG, USDA	\$236,442
WSU MOUNT VERNON NW REC (D)	Jones, Stephen	Early Maturing Dry Beans for Specialty Markets in Western WA	WA AG, Specialty Crop BG, USDA	\$222,998
ANIMAL SCIENCES (D)	Rodgers, Buel	Assessment of Muscle Function in LGMD2i Mouse Models	LGMD2I RES	\$222,091
<b>COLLEGE OF AGRICULTURE HUMAN &amp; NATURAL RESOURCE SCIENCES</b>				
INT'L RESEARCH & AGRI DEVELOP (D)	Taugher, Colleen	Rwanda: Women's Leadership Program in Agriculture	MI ST UNIV, AM COUNCIL ED	\$75,000
INT'L RESEARCH & AGRI DEVELOP (D)	Reganold, John	Sustainable Intensification & Diversification of Maize-based Agroecosystems in Malawi	INTL MAIZE WHEAT IMP CTR	\$69,468
INT'L RESEARCH & AGRI DEVELOP (D)	Whiteman, Michael	Borlaug Fellowship Program Kenya and Uganda	USDA, Borlaug	\$61,947
INT'L RESEARCH & AGRI DEVELOP (D)	Whiteman, Michael	Fellowship: Induction of Innate Immunity Genes in Wheat by an Endogenous Host Factor and Biocontrol Pseudomonas (Tunisia)	USDA, Borlaug	\$29,744
SCH OF DESIGN & CONST-CAHNRS (D)	Brooks, Kerry	Testing a Geospatial Predictive Policing Strategy: Application of ArcGIS 3D Analyst Tools for Forecasting Commission of Residential Burglaries	DOJ, NIJ	\$28,132
HUMAN DEVELOPMENT (D)	Handy, Deborah	FCCLA-State	WA OSPI	\$19,000
HUMAN DEVELOPMENT (D)	Handy, Deborah	FCCLA-Federal	WA OSPI	\$15,000
APPAREL MERCH DESIGN & TEXT (D)	Bradley, Linda	Holdeman Mennonite Women's Dress as a Symbolic Marker of Change in Social Roles	PLETT HISTORICAL RES FDN	\$7,470
SCH OF DESIGN & CONST-CAHNRS (D)	Ryan, Kathleen Anne	Boundary County Library Expansion	BOUNDARY CO LIBRARY	\$5,000
SCH OF DESIGN & CONST-CAHNRS (D)	Ryan, Kathleen Anne	City of Toledo/Vision: Toledo Project	CTY OF TOLEDO	\$1,650
<b>COLLEGE OF ARTS AND SCIENCES - SCIENCE FOCUS</b>				
PHYSICS AND ASTRONOMY (D)	Kuzyk, Mark	PMU: EFRI-ODISSEI: Photomorphon networks: Intelligent shape changing structures	NSF, EFRI	\$2,000,000
PHYSICS AND ASTRONOMY (D)	Engels, Peter W	CA INST TECH, Zero-G Studies of Few-Body and Many-Body Physics	NASA	\$1,237,000
INSTITUTE FOR SHOCK PHYSICS (D)	Eilers, Hergen	ASL - Spatial-Light-Modulator-based Signatures of Nanocomposites for Unique Surface Markers	DOD	\$1,235,873
CHEMISTRY (D)	Hill, Herbert	Field detection and quantification of inorganic species from surfaces	DOD	\$1,050,000
SCHOOL OF BIOLOGICAL SCIENCES (D)	McGuire, Michelle	INSPIRE Track 1: What is Normal Milk? Sociocultural, Evolutionary, Environmental, and Microbial Aspects of Human Milk Composition	NSF	\$950,000
CHEMISTRY (D)	Reilly, Peter	IBDR: Development of a Digital Ion Trap Mass Spectrometer for Resolved Mass Analysis of Intact Singly-Charged Proteins, Complexes, RNA, DNA an	NSF	\$685,800

Fiscal Responsible Unit	Contact/Lead PI Name	Title	Agency	Estimated Award Total
CHEMISTRY (D)	Wall, Nathalie	Managing Zirconium Chemistry and Phase Compatibility in Combined Process Separations for Minor Actinide Partitioning	DOE	\$568,750
CHEMISTRY (D)	McHale, Jeanne	SusChEM: Next-Generation Dye-Sensitizers: Beyond the Shockley-Queisser Limit	NSF	\$499,999
INSTITUTE FOR SHOCK PHYSICS (D)	Yoo, Choong-Shik	Scale-up Synthesis of Polymeric Carbon Monoxide CDS&E: Mathematical Models and Computational Methods for the Tumor Microenvironment	DOD	\$450,000
MATHEMATICS (D)	Dillon, Robert		NSF	\$380,938
<b>COLLEGE OF ARTS AND SCIENCES - SOCIAL SCIENCE/HUMANITIES FOCUS</b>				
CRIT CULTURE/GNDR/RACE STUDIES (D)	Withey, Kimberly	Mukurtu Mobile: Empowering Knowledge Circulation Across Cultures	NEH, Digital Humanities	\$319,331
ANTHROPOLOGY (D)	Tushingham, Shannon	Human Use of Psychoactive Plants in Ancient North America: Experimental Method Development & Applications in Archaeological Residue Analysis	NSF	\$204,972
SOCIOLOGY (D)	Schwartz, Jennifer	21st Century Corporate Financial Crime: Statistical Portrait, Executive and Firm Risk Factors, and Rich Database	PA ST UNIV, NIJ, DOJ	\$196,032
CRIMINAL JUSTICE & CRIMINOLOGY (D)	Hamilton, Zachary	Interagency Agreement between the Evergreen State College / The Washington State Institute for Public Policy (WSIPP) and WSU	EVERGREEN ST COLL, WA INST PUB POLICY	\$80,000
CRIMINAL JUSTICE & CRIMINOLOGY (D)	Hamilton, Zachary	Washington State Offender Risk Assessment Project	WA CORRECTIONS	\$76,383
ANTHROPOLOGY (D)	D'Alpoim Guedes, Jade	High and Dry: Understanding the Movement of Agriculture and Development of Pastoralism in the Eastern Himalayas	AM CNCL LRND SOC, NEH	\$37,500
ANTHROPOLOGY (D)	Grier, Colin	Doctoral Dissertation Improvement Grant: Evaluating Community Dynamics of a Hunter- Fisher-Gatherer Village through the Inter-Household	NSF	\$23,977
<b>COLLEGE OF EDUCATION</b>				
ED LDSHP SPORT STU ED/CO-PSY (D)	French, Brian	Computer Science Teacher Professional Development: Examining Factors that Influence Effective Computer Science Teaching and Learning	PURDUE UNIV, NSF, CNS	\$61,602
TEACHING AND LEARNING (D)	Miller, Darcy	Enhancing Capacity for Special Education Leadership (ECSEL)	UNIV WA, ED	\$60,198
ED LDSHP SPORT STU ED/CO-PSY (D)	French, Brian	Psychometric Research for the Refinement of the Washington Assessment of the Risks and Needs of Students	WA ST CTR FOR COURT RES	\$21,412
<b>COLLEGE OF ENG VOILAND</b>				
CIVIL AND ENVIRONMENTAL ENGRNG (D)	Wen, Haifang	Novel Development of Bio-based Binder for Sustainable Construction	DOT, TRAC	\$999,940
SCHOOL OF ELECT ENG & COMP SCI (D)	Cook, Diane	CI-ADDO-EN: Smart home in a box: Creating a large scale, long term repository for smart environment technologies	NSF	\$900,000
CENTER FOR MATERIALS RESEARCH (D)	Lynn, Kelvin	Computation and Implementation of optimum ampoule rotation technique for MVB and THM growth of detector grade Cadmium Zinc Telluride	DOE	\$747,525
SCHOOL OF ELECT ENG & COMP SCI (D)	Broschat, Shira	PMU: ABI Innovation: Next-Gen Clustering: Fast and Accurate Ways to Cluster Proteins	NSF	\$666,969
SCHOOL OF ELECT ENG & COMP SCI (D)	Taylor, Matthew	Lifelong Transfer Learning for Heterogenous Teams of Agents in Sequential Decision Processes	DOD	\$606,361
SCHOOL OF MECH AND MATLS ENG (D)	McCloy, John	Compositional Dependence of Glass Corrosion Associated with Nepheline Formation	DOE	\$599,998
SCHOOL OF ELECT ENG & COMP SCI (D)	Hundhausen, Christopt	EXP; Exploring Social Programming Environments in Early Computing Courses	NSF	\$549,763
CENTER FOR MATERIALS RESEARCH (D)	Lynn, Kelvin	Approaching the Shockley Queisser Limit with Epitaxial CdTe: Subcontract from NREL	DOE, ALLC SUST ENG - NREL	\$424,623

Fiscal Responsible Unit	Contact/Lead PI Name	Title	Agency	Estimated Award Total
SCHOOL OF ELECT ENG & COMP SCI (D)	Srivastava, Anurag	CPS: Diagnostics and Prognostics Using Temporal Causal Models for Cyber Physical Systems- A case of Smart Electric Grid	NSF	\$400,000
SCHOOL OF ELECT ENG & COMP SCI (D)	Shirazi, Behrooz	REU Site: New-generation Power-efficient Computer Systems Design	NSF	\$323,660
<b>COLLEGE OF MEDICAL SCIENCES</b>				
MEDICAL SCIENCES (D)	Wisor, Jonathan	Chronic methamphetamine disrupts sleep-dependent molecular/energetic homeostasis	HHS, NIDA	\$395,577
MEDICAL SCIENCES (D)	Roberts, Kenneth	WWAMI Spokane 2nd Year Medical Education Project	EMPIRE HLTH FDN	\$250,000
MEDICAL SCIENCES (D)	Li, Weimin	The nuclear phosphoinositide signaling regulates Star-PAP control of specific apoptotic gene expression	AM HEART ASSC SPOKANE CNTY	\$231,000
HEALTH POLICY & ADMINISTRATION (D)	Murphy, Sean Michael	Framework for Cost Effectiveness	MED SOC	\$10,000
<b>COLLEGE OF NURSING</b>				
COLLEGE OF NURSING (A)	Fitzgerald, Cynthia	Using IPE to Improve Care for Patients with MCC Initiative	HHS, BHPR PROVIDENCE MED	\$1,102,819
COLLEGE OF NURSING (A)	Corbett, Cynthia	Staff Assignment Agreement between WSU and PMRC	RES CTR	\$50,400
COLLEGE OF NURSING (A)	Daratha, Kenn B	Cost Trajectories of Hospitalization for Patients with ESRD	UNIV WA	\$29,000
COLLEGE OF NURSING (A)	Graves, Janessa	Variation in inpatient costs for severe traumatic brain injury (TBI)	UNIV WA, HHS	\$20,175
COLLEGE OF NURSING (A)	Vandermause, Roxann	Jonas Nurse Leader/Veterans Healthcare Scholars Program	AACN, Jonas Scholar Program	\$20,000
COLLEGE OF NURSING (A)	Dotson, Joann	It's About Two Baby and You: iPad Evaluation and Expansion	MARCH OF DIMES	\$17,843
COLLEGE OF NURSING (A)	Ward, Linda D	Assessment of Genomic Literacy among Baccalaureate Nursing Students in the United States: A Pilot Study	INTL SOC NURSES GEN	\$2,000
<b>MURROW COLLEGE OF COMMUNICATION</b>				
NORTHWEST PUBLIC RADIO (D)	Swanson, Kerry	Yakima Valley Community Information Connection	YAKIMA VLY COMM FDN	\$1,052,358
KWSU/KTNW PUBLIC TELEVISION (D)	Marcelo, Marvin	FY14 Television Community Service Grant Agreement, Television Local Service Grant	CPB	\$703,245
NORTHWEST PUBLIC RADIO (D)	Marcelo, Marvin	FY14 Radio Community Service Grant Agreement	CPB	\$360,411
PROGRAM IN COMMUNICATION (D)	Paveglio, Travis Brent	Understanding the Vulnerability of Communities and Populations in the NW to Climate Related Changes in Forests & Grasslands	USDA	\$14,192
KWSU/KTNW PUBLIC TELEVISION (D)	Marcelo, Marvin	FY14 Television Interconnect Grant Agreement	CPB	\$13,469
PROGRAM IN COMMUNICATION (D)	Shors, Benjamin	The Blackfeet Flood: Mobile and Interactive Documentary Shorts	HUMANITIES MT COMM FDN N	\$6,750
NORTHWEST PUBLIC RADIO (D)	Swanson, Kerry	Community Foundation of NCW Matching Fund Grant	CENT WA	\$4,000
<b>COLLEGE OF PHARMACY</b>				
PHARMACY COLLEGE OF (A)	Pollack, Gary	Microscopy & Imaging Core Lab Equipment	HSSA	\$705,000
PHARMACEUTICAL SCIENCES (D)	Wang, Zhenjia	Caveolar Transport of Therapeutic Nanoparticles	HHS, NHLBI	\$496,800
PHARMACY COLLEGE OF (A)	Pollack, Gary	Pharmacogenomics Core Lab Equipment	HSSA	\$360,000
PHARMACY COLLEGE OF (A)	Pollack, Gary	Recruitment Start-up Support for Dr. Jiyue Zhu	HSSA	\$300,000
PHARMACY COLLEGE OF (A)	Pollack, Gary	Recruitment Start-up Support for Dr. Salah Ahmed	HSSA	\$300,000
PHARMACY COLLEGE OF (A)	Pollack, Gary	Recruitment Start-up Support for Dr. Scott Landfear	HSSA	\$300,000
PHARMACOTHERAPY/SPOKANE (D)	White, John Raymond	Pharmacokinetic Analysis of Caffeine (160 mg) Administered Rapidly Via Chilled Coffee or Chilled ED or Slowly Via Hot Coffee or Chilled Coffee or ED	AM BEV ASSC	\$263,039

Fiscal Responsible Unit	Contact/Lead PI Name	Title	Agency	Estimated Award Total
PHARMACEUTICAL SCIENCES (D)	Zhu, Jiyue	Repression of the hTERT gene during cell differentiation	HHS-NIGMS	\$248,902
PHARMACEUTICAL SCIENCES (D)	Ahmed, Salah-Uddin	Mechanism of Mcl-1 regulation by EGCG in rheumatoid arthritis	ARTHRITIS FDN	\$200,000
PHARMACOTHERAPY/SPOKANE (D)	Wysham, Carol H	CARMELINA - Cardiovascular Safety & Renal Microvascular outcome study with LINAgliptin	QUINTILES	\$93,351
<b>COLLEGE OF VETERINARY MEDICINE</b>				
VET CLIN SCI (D)	Bayly, Warwick	Leawaina Camel Hospital Project	LEAWAINA CAMEL HOSP	\$1,500,000
VETERINARY MICROBIOLOGY & PATH (D)	Bankhead, Troy	Study of Immune Avoidance During the Enzootic Cycle of the Lyme Disease Pathogen	HHS-NIAID	\$1,269,194
VETERINARY MICROBIOLOGY & PATH (D)	Mealey, Robert	Determinants of antibody-mediated protection against Theileria equi infection	USDA, AFRI	\$500,000
WA ANIMAL DISEASE DIAG LAB (D)	Baszler, Timothy V	Expanded Testing Methods for Elements and Metals in Animal Diagnostic Specimens	HHS	\$495,000
SCH OF MOLECULAR BIOSCIENCES (D)	Oatley, Jon	Spermatogonial Stem Cell Transplantation	USDA, AFRI	\$471,542
INTEGRATIVE PHYSIOLOGY & NEURO (D)	Fuchs Lokensgard, Rita	Neuronal ensembles of drug context-induced impulsive decision making	HHS, NIDA	\$428,134
PAUL G. ALLEN SGAH (D)	Celli, Jean	Brucella mechanisms of autophagy-mediated egress	HHS, NIAID	\$377,500
INTEGRATIVE PHYSIOLOGY & NEURO (D)	Harding, Joseph	PMU: Acquisition of a Live Small Animal Optical/CT Imager	MURDOCK TRUST	\$369,600
VETERINARY MICROBIOLOGY & PATH (D)	Bose, Santanu	Effect of SB compound on respiratory virus pathogenesis in mice	SPRING BANK PHARM	\$250,660
INTEGRATIVE PHYSIOLOGY & NEURO (D)	Harding, Joseph	Evaluation of a small molecule HGF mimetic as an ALS therapeutic	LSDF	\$250,000
PAUL G. ALLEN SGAH (D)	Palmer, Guy	Paul Allen Research Project - Nelson Mandela African Institute of Science and Technology - Tanzania	PAUL G ALLEN FDN	\$200,346
<b>WASHINGTON ST UNIV - TRI-CITIES</b>				
WSU - TRI-CITIES (D)	Moo-Young, H	Design and Construction of the Wine Science Center at WSU Tri-Cities	CTY OF RICHLAND	\$4,950,000
WSU - TRI-CITIES (D)	Morales, Genoveva	One Vision Partnership	WA OSPI	\$400,000
WSU - TRI-CITIES (D)	Yang, Bin	Synthetic Design of Microorganisms for Lignin Fuel	DOE, TX A&M UNIV	\$291,747
WSU - TRI-CITIES (D)	Zhang, Xiao	A green conversion process to produce high value phenolic compound from biorefinery lignin	DOT, OR ST UNIV	\$199,998
WSU - TRI-CITIES (D)	Yang, Bin	Catalytic Production of Aviation Fuel Hydrocarbons from Lignocellulosic Biomass-Derived Lignin	DOT, OR ST UNIV	\$199,945
WSU - TRI-CITIES (D)	Mays, W	Hanford Oral History Project	MISSION SUPPORT ALL	\$121,495
WSU - TRI-CITIES (D)	Lei, Hanwu	Hydrogen saving process for cycloalkanes (naphthenes) in jet fuels from diverse Washington state forest biomasses	UNIV WA	\$80,000
WSU - TRI-CITIES (D)	Ahring, Birgitte	Proposal to USDA Scientific Exchange Program to Host a Visiting Scholar from Panama at Washington State University, Tri-Cities	USDA, Energy & Climate Partnership of the Americas	\$34,969
WSU - TRI-CITIES (D)	Yang, Bin	Low-Energy Rotary Shear for Sub-millimeter Particle Production	DOE, SBIR, FOREST CONCEPTS LLC	\$27,242
WSU - TRI-CITIES (D)	Balaev, Mikhail	Who Rules America Revisited	AM SOC ASSOC	\$7,000
<b>WASHINGTON ST UNIV-SPOKANE</b>				
WSU - SPOKANE (D)	Belenky, Gregory	Fatigue Risk Management System Flight Studies	UNITED AIR LINES	\$752,073
WSU - SPOKANE (D)	Dyck, Dennis	Multi-family Groups for Spinal cord Injury and Family Caregivers	NEILSEN FDN	\$289,495

Fiscal Responsible Unit	Contact/Lead PI Name	Title	Agency	Estimated Award Total
WSU - SPOKANE (D)	Van Dongen, Hans	Development and Validation of FedEx Fatigue Model	FEDEX, PULSAR	\$200,000
WSU - SPOKANE (D)	Van Dongen, Hans	Sleep Assessment Operations Research Task Order AD: Peer Counselor Continuing Education Classes	DOD	\$144,940
WSU - SPOKANE (D)	Dyck, Dennis	Youth & Family Peer Support	WA DSHS	\$74,877
WSU - SPOKANE (D)	Dyck, Dennis	Task Order AC: Spanish Certified Peer Counselors	WA DSHS	\$54,500
WSU - SPOKANE (D)	Dyck, Dennis	Youth N/Action WA RYS Year 2	WA DSHS	\$33,000
WSU - SPOKANE (D)	Dyck, Dennis	Validation of the ACRA Cognitive Assessment System	WA DSHS	\$30,845
WSU - SPOKANE (D)	James, Stephen	Youth N/Action - Mason County	NTI INC	\$30,629
WSU - SPOKANE (D)	Dyck, Dennis	Task Order AB: Certified Peer Counseling Tests	WA DSHS	\$21,000
WSU - SPOKANE (D)	Dyck, Dennis		WA DSHS	\$20,000
<b>WASHINGTON ST UNIV-VANCOUVER</b>				
WSU - VANCOUVER (D)	Harrison, John	Integrating biogeochemistry and physics to understand hot spots and hot moments for nitrogen transformation in lakes and reservoirs	NSF	\$574,997
WSU - VANCOUVER (D)	Portfors, Christine	Mechanisms underlying encoding of vocalizations in the auditory system	HHS-NIDCD	\$453,000
WSU - VANCOUVER (D)	Coffin, Allison	Characterizing the protective effects of caffeine and other natural products in a zebrafish model of hearing loss	HHS-NIDCD	\$444,845
WSU - VANCOUVER (D)	Henderson, Stephen	Hydrodynamics and morphodynamics of mangrove swamps in the Mekong Delta, Vietnam: WSU component	DOD	\$150,557
WSU - VANCOUVER (D)	Tissot, Brian	Ecology and Fishing Impacts on Aquarium Fishes on Mesophotic Reefs in Hawaii	DOC	\$79,870
WSU - VANCOUVER (D)	Oppegaard, Brett	Create Old Faithful Mobile App	DOI	\$41,125
WSU - VANCOUVER (D)	Sekhar, Praveen	Establish Guidelines for the Development of Electrochemical Sensors for In-Situ Low Level Measurements of Nitrogen Oxides (NOx) and ammonia...	DOE-LANSLC - LANL	\$40,000
WSU - VANCOUVER (D)	Gurocak, Hakan Berat	Innovations in Advanced Materials & Metals (IAM2) Project	DOC, COLUMBIA RIVER ECON DEV MARGUERITE	\$40,000
WSU - VANCOUVER (D)	Maclean, Alair	Research on Selection into the Military BPA University Consortium Special Study:	CASEY FDN	\$30,000
WSU - VANCOUVER (D)	Chiu, David	Synchrophasors. Advisor: D. Chiu (WSUV)	DOE, OR BEST CTR	\$20,146
<b>WSU EXTENSION</b>				
ENERGY PROGRAM (D)	Currier, Todd W	CEEP FY14-15	WA COMMERCE	\$9,900,000
ENERGY PROGRAM (D)	Sjoding, David	NW CHP Tech Asst with Add on Washington State Extension IPM Coordination Program 2013-2016	DOE	\$2,178,104
WSU PROSSER IAREC (D)	Walsh, Doug	Washington Stormwater Center Operation Budget	USDA	\$554,500
WA STORMWATER CENTER (D)	Stark, John	NWCAA Greening the Food Chain Skagit and Whatcom Counties	WA ECOLOGY	\$500,375
ENERGY PROGRAM (D)	Jensen, James	K12 Densified Biomass Demonstration	NW CLEAN AIR AGCY	\$439,500
ENERGY PROGRAM (D)	Sjoding, David	Phase 1 - Shellfish Model Stewardship Program	USDA, WA COMMERCE	\$400,000
WSU COUNTY EXTENSION (D)	Simmons, Robert C	BPA HPWH Demand Response Research	EPA, PUGET SOUND PARTNERS	\$300,000
ENERGY PROGRAM (D)	Eklund, Kenneth	2014-2015 Military Teen Adventure Camps	DOE	\$284,480
WSU COUNTY EXTENSION (D)	Faini, Raymond J	4-H National Mentoring Program	USDA, PURDUE	\$204,644
WSU COUNTY EXTENSION (D)	Edwards, Janet W	The Snohomish County Agricultural Compost Research and Outreach Project (SCACROP)	UNIV	\$200,765
WSU COUNTY EXTENSION (D)	Corbin, Andrew	YA4-H! Food Smarts	DOJ, WA 4-H FDN	\$200,000
WSU PUYALLUP RES & EXT CTR (D)	Calodich, Shirley M		USDA, WA AG CONAGRA, NATL 4-H CNCL	\$200,000
				\$150,000

Fiscal Responsible Unit	Contact/Lead PI Name	Title	Agency	Estimated Award Total
<b>ADMINISTRATIVE UNITS</b>				
ECONOMIC DEVELOPMENT (D)	Fatland, Anson	Investing in Manufacturing Community Partnerships	DOC, IMCP	\$80,000
GRADUATE SCHOOL (A)	Andrefsky, William	NSF Graduate Research Fellowship - various	NSF	\$2,124,666
INTERNATIONAL PROGRAMS (A)	Arasu, Prema	International Research Evaluation Metrics	NSF	\$235,269
INTERNATIONAL PROGRAMS (A)	Arasu, Prema	SCEP US Team 1 Ion Mobility Food safety: Detection of food contaminants by fast and accurate Ion Mobility Spectroscopy methods	USDA, SCEP	\$11,500
OFFICE OF ALTERNATIVE ENERGY (D)	Cavalieri, Ralph	PMU: Center of Excellence for Alternative Jet Fuels and Environment	DOT	\$574,228
OFFICE OF RESEARCH - CEREO (D)	Hampton, Stephanie	Workshop: Ecology Under Lake Ice	NSF	\$20,520
OFFICE OF RESEARCH - SESRC	Krebill-Prather, Rose	Evaluation of Selected State Administered Training Programs, Telephone Survey of Program Participants	WA WORKFRC TRN ED CB	\$108,998
OFFICE OF RESEARCH - SESRC	Mann, Candiya	GeoTech Center of Excellence Evaluation	KY COMM AND TECH COLL SYS	\$55,000
OFFICE OF RESEARCH - SESRC	Le, Yen	Rocky Mountain Cooperative Ecosystem Studies Unit-Katmai National Park Survey-Visitor Survey	DOI	\$53,512
OFFICE OF RESEARCH - SESRC	Moore, Danna	Planning for Sustainable Shellfish Aquaculture: Identifying Current Activities, Public Perceptions, Conflicts, and Compatibilities - Part 1	PAC SHELLFISH INST	\$51,145
OFFICE OF RESEARCH - SESRC	Le, Yen	Rocky Mountain Cooperative Ecosystem Studies Unit-Chickamauga and Chattanooga National Military Park Survey-Visitor Survey	DOI	\$47,206
OFFICE OF RESEARCH - SESRC	Le, Yen	Rocky Mountain Cooperative Ecosystem Studies Unit-Fort Monroe National Park Survey-Visitor Survey	DOI	\$42,704
OFFICE OF RESEARCH - SESRC	Le, Yen	Rocky Mountain Cooperative Ecosystem Studies Unit-George Washington Carver National Monument - Demographic Study	DOI	\$33,730
OFFICE OF RESEARCH - SESRC	Krebill-Prather, Rose	State of Washington Department of Early Learning Data Analysis, Contract #14-1151, CCDATA	WA DEL	\$500



## **APPENDIX F**

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### **DATA REQUEST DOCUMENTS**

SUBCOMMITTEE DATA REQUEST

COLLEGE SURVEY QUESTIONS

## 120-Day Study Subcommittee Data Requests

The following is a narrowed list of information that was requested by the four (4) 120-day subcommittees. The information below is categorized by the office responsible for the primary data collection. Not all of the data collected is included in the appendices due to concerns over the quality of the data collected. Data can be accessed by WSU employees via hyperlinks included in the electronic version of this document, or by contacting WSU's Office of Grant & Research Development (OGRD).

### Office of Research/Office of Grants & Research Development Responsible:

- **Faculty and Student Engagement/Productivity subgroup:**
  - Information requested from WORQS. ([Link to data](#))
    - Numbers of journal editorships, editorial board memberships held by faculty; (via WORQS).
    - National/international grant (or other) review board memberships/chair positions held by faculty; (via WORQS).
    - Professional society leadership roles performed by faculty; (via WORQS).
    - Numbers of exhibitions/juried shows/ performances/speaking invitations or invitations to chair meetings or adjudicate high-level competitions, etc. (via WORQS).
  - Numbers of grant proposals submitted (total and per Tenure/Tenure Track (T/TT)\*); (OGRD to obtain via MyResearch). ([Link to data](#))
  - Number of grant awards received (total and per T/TT\*); (OGRD to obtain via MyResearch). ([Link to data](#))
  - Numbers of large multi-faculty proposals (such as program projects) submitted and awarded; (OGRD to obtain via MyResearch.) ([Link to data](#))
  - Numbers of trainee support ('T32' type) applications submitted and awarded. (OGRD to obtain via MyResearch). ([Link to data](#))
  - Proposal success rate (NSF and NIH) (OGRD to obtain via MyResearch). ([Link to data](#))
  - Facilities & Administration (F&A) Expenditure amounts (OGRD to obtain via data warehouse for WSU, VPR to request of AAU peers).
  - F&A Reallocation Models (VPR to request of AAU peers).
  - Job placement information (VPR to request of Alumni Association Office). ([Link to data](#))
  - Percentage of T/TT\* faculty at WSU on sabbatical per year, relative to peers (VPR to request from Office of the Provost).
- **Research Themes subgroup:**
  - Ask all faculty to submit their ideas for research “grand challenge like” themes for the university system. (VPR to create website and send request to all faculty). ([Link to data](#))
- **Outreach, Engagement, and External Economic Development subgroup:**
  - VPR to request the following questions of AAU peers:
    - In your opinion, what specific activities for increasing research visibility have worked best, leading to research success? Can you provide examples?
    - Please describe the institutional support structure you have for increasing faculty research visibility (information about opportunities, funding to meet stakeholders, funders, etc.)
    - How do you measure success of your publicity efforts in relation to your research efforts (increased funding, awards, collaborations, start-ups, economic impact, etc.)?

- Please describe the mentoring programs you have in place to prepare faculty to be competitive for prestigious national faculty awards.
- How does your institution promote your faculty research internationally? What metrics do you use to measure this effort?
- Please describe how you promote industry-related engagement at your institution.
- How does your institution transfer research discoveries out of the university?
- Please describe how the institution leverages the economic returns (royalties etc.) to further advance the research enterprise.

### **Institutional Research Office Responsible:**

#### Post Doc and RA/TA info:

- WSU counts overall and by college/dept. as needed.[\(Link to data\)](#)
- RA/TA counts overall and by source of funding.[\(Link to data\)](#)
- OSU grad assistant stipend report from OSU, and WSU data. Stipends are reported by type of assistantship (RA/TA); there is no detail for Masters vs. PhD students. [\(Click Here to Download OSU Data\)](#) [\(Click Here to Download WSU Data\)](#)

#### Students:

- Number of graduate students by program (including % minority, % women and % international).[\(Link to data\)](#)

#### Faculty data, T/TT measures:

- WSU and Peer (Legis and AAU Publics) information for Primarily Instructional, Primarily Research, and Instruction/Research/Public Service combined from IPEDS. [\(Click Here to Download OSU Data\)](#)
- Salaries--OSU faculty salary survey for WSU (spring 2014) and peers (as submitted for AY2013-14). Report is by discipline (department for WSU) and rank for full-time instructional faculty including buyouts for research. [\(Link to data\)](#)
- Historical Instructional Faculty Headcount and FTE by Rank (including Clinical). [\(Link to data\)](#)
- Academic Profiles – available on the [Institutional Research website](#)

#### Scholarly/creative productivity:

- T/TT numbers, Publication Count, Hirsch Index, NSF Facilities total research space, FY2008 to FY 2013 for AAU Publics. [\(Link to data\)](#)

*\*Tenure/Tenure Track is defined as faculty who were primarily instruction, primary research, and instruction combined with research/public service via IPEDS.*

## **"120-DAY" STUDY DATA COLLECTION QUESTIONNAIRE**

For all the questions below, indicate whether your Unit collects this type of information. If yes, proceed to answer the question(s). If not, indicate why. Also, you may save your answers and come back later at any time by clicking one of the "Save Answers" buttons throughout the survey.

### **Research Infrastructure**

We are gathering information regarding university research infrastructure. This infrastructure is broadly defined as facilities, instrumentation (range \$200K-\$2M) and staffing support for units that serve more than one department or college. This is a preliminary survey, we will be collecting more specific information at a later date. We will follow up with interviews with relevant college leaders and faculty users. Please survey within your unit, college or department to address the questions below. Where possible please group like-items together in single categories (e.g. imaging-capabilities, animal resources, plant resources ...) Also consider non-equipment research support (e.g. grant submission/administration, compliance, libraries...)

### **Equipment / Capabilities**

- What equipment/capabilities are present that should be included as university research infrastructure by the definition above?
- Is this equipment part of a core center, institute or lab?
- If part of a core unit, please list the center, institute or lab by name(s).
- For the category/item listed, indicate the most critical limitations (e.g., dated technology, delayed maintenance, inadequate staff support, other ...)? Indicate how this limitation can be overcome.
- Please estimate the costs of making these improvements (a rough estimate is adequate).

What equipment/capabilities may not be present at all, but are needed?

### **Faculty and Student Engagement/Productivity**

#### **Prestigious Awards**

- **Prestigious awards and honors bestowed on current faculty – This is the National Research Council (NRC) list of highly prestigious awards that the AAU measures\***
  - Area
  - Field
  - Award
  - WSU ID#
  - Name
- Other prestigious awards in your field

#### **General**

- Number of Undergrad students involved in research/creative activity
  - Percent of those categorized as minority students
- Number of Graduate publication counts
- Number of Undergraduate publication counts
- What is your stated standard for teaching load?
- What is your actual average teaching load?

## Outreach, Engagement and Economic Development

### Research Visibility

- What key events do your faculty attend that promote research visibility (e.g., conferences, panels, industry meetings)?
- In your opinion, does increasing research visibility (e.g., through conference attendance, news releases or web sites) lead to research success?
  - How?
- How does your unit support faculty research visibility (e.g., information about opportunities, funding to meet stakeholders, funders, etc.)?\*
- What barriers prevent you from supporting faculty in research visibility?\*
- What kind of information do you send to external stakeholders and the general public about WSU research? If possible, provide the names of, or link to each, the frequency of each and number of people targeted.
  - Print newsletters
  - E-newsletters
  - HTML e-mails
  - Postcards
  - Social Media Announcements (e.g. Facebook, Twitter, Blogs)
  - Other (please specify)
- Which external stakeholders do you send research news to?
  - Deans/chairs at other institutions
  - National organizations in your field
  - Government officials
  - Industry
  - Foundations
  - Commodity groups
  - Alumni and friends
  - Other (please specify)
- What tangible results have come from your publicity efforts (e.g.: increased funding, speaking requests, collaborations)?\*

If possible, please provide the following information about research news press releases:

- How many do you produce and distribute a year?
- What types of outlets and reporters do you send them to?
- How many of your researchers have been interviewed by an actual reporter?
- Using names of outlets and their circulations or unique-visitor counts, can you estimate the potential audience sizes of any of your stories?

### Awards and Recognition

- Describe your mentoring program to prepare faculty to be competitive for national awards.\*
- How do you recognize and value faculty that achieve national recognition through competitive awards?
- Please list your strengths in this area, and barriers and needs.\*

### Economic Engagement and Return on Research

- Does your unit value the economic impact of research happening in your unit?\*
- If so, how does the unit recognize/reward faculty for the added value? If not, why?\*
- Does your unit value contributions of your faculty to the state and the national economy through direct engagement with industry through sponsored projects and/or commercialization activities?
  - If yes, how does the unit recognize/reward faculty for industry related engagement? Provide any metrics you have for your unit regarding industry related activities (e.g., sponsored projects, SBIR grants, start-ups, industry endowed chairs, industry supported scholarships, industry donated property/equipment, industry sponsored tuition/students, etc.). If not, why?
- Do your faculty know about the intellectual property and commercialization services offered by the Office of Commercialization?
- Do you promote this to your faculty and if so, how?
- Do you consider your unit to be entrepreneurial in transferring research discoveries out of the university?
  - If yes, please list examples of success cases.
- Explain concerns, gaps, barriers, and needs.\*

### Domestic/International Outreach and Engagement

- Do your faculty engage in domestic/international collaborations?\*
- If not, why?\*
- If so, are these collaborations valued?\*
- How does the unit recognize/reward faculty for these collaborations?\*
- Does your unit value the regional/national/global impact of research activities of your faculty and does your unit measure domestic/international activity outcomes? Please explain.
- Does your unit promote your faculty research internationally?
  - If so, how? If not, why?
- Please provide any metrics you have for your unit regarding collaborative (domestic/international) research activities (collaborative research funding ## and \$\$, international visiting scholars, joint research centers and laboratories, ## graduate students supported by external agencies, joint publications).
- Please list examples of successful research collaborations (domestic/international).
- Explain concerns, gaps, barriers, and needs.\*

\* 120 Day Study Subgroup required response

[Type here]

## **APPENDIX G**

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### **RESEARCH THEMES SUBCOMMITTEE DOCUMENTS**

COLLEGE STRENGTHS REPORTS

RESEARCH THEMES SUBMISSIONS TO WEBSITE

PRELIMINARY THEME ANALYSIS REPORTS

## Currently Identified WSU Research Strengths

College/Campus	Theme / Goal
Carson College of Business	<ol style="list-style-type: none"> <li>1. Behavioral Business Research</li> <li>2. Corporate Governance, Ethics and Stakeholder Relations</li> <li>3. Global Dimensions of Business</li> </ol>
College of Agricultural, Human, and Natural Resource Sciences	<p><u>Agriculture</u></p> <ol style="list-style-type: none"> <li>1. Foods for Health               <ol style="list-style-type: none"> <li>a. Basic plant sciences: Genomics Metabolomics, and Genetics</li> <li>b. Crop production systems and plant breeding</li> <li>c. Food processing systems</li> <li>d. Biologically intensive (sustainable) and organic agriculture</li> </ol> </li> <li>2. Animal Reproductive Biology</li> <li>3. Biofuels and bioproducts</li> </ol> <p><u>Human Sciences</u></p> <ol style="list-style-type: none"> <li>1. Individual and Family Development, and Prevention Science</li> <li>2. Apparel design for specific populations, textile characteristics and applications</li> <li>3. Economics: Agricultural, Behavioral, Consumer, Health, International, Marketing, Supply Chain, and Transportation</li> <li>4. Interior and Landscape Design</li> </ol> <p><u>Natural Resources</u></p> <ol style="list-style-type: none"> <li>1. Water resource management for ecosystem services and health.</li> <li>2. Planning for resilience in the face of changing water cycles due to climate change.</li> <li>3. The Columbia Basin and Puget Sound: Laboratories for agricultural and urban sociohydrology and economics.</li> <li>4. Environmental and Resource Economics</li> </ol>



## Currently Identified WSU Research Strengths

College/Campus	Theme / Goal
<p><b>College of Arts and Sciences</b></p> <p>Targets for Innovation:</p> <p>A. Development and adoption of clean technologies</p> <p>B. Climate change and global food &amp; water security</p> <p>C. Sustaining health and wellbeing</p> <p>D. Decision making and integrated data sciences</p> <p>E. Economic development</p>	<ol style="list-style-type: none"> <li>1. Artistic expression and cultural understanding {B,C,E}</li> <li>2. Bioethics {B,C,E}</li> <li>3. Biological basis of addiction {C}</li> <li>4. Chemistry of living systems {C,E}</li> <li>5. Child development and adjustment {C}</li> <li>6. Composition and musical recording {C,E}</li> <li>7. Corrections and public safety {C,D}</li> <li>8. Cultural effects on human adaption {A,B,C}</li> <li>9. Culture and digital technology {C,E}</li> <li>10. Decision making from the individual level to the public policy level {A,B,C,D,E}</li> <li>11. Evolutionary genetics {B,C,D,E}</li> <li>12. Materials Physics {A,D,E}</li> <li>13. Mathematical biology {B,C,E}</li> <li>14. Media representations of culture and gender {C}</li> <li>15. Media and language effects on understanding environmental issues {B}</li> <li>16. Nanoscience {A,E}</li> <li>17. Nuclear Chemistry {A,B,E}</li> <li>18. Plant biology {B,C}</li> <li>19. Statistics. modeling, and mathematical analysis {A,B,C,D,E}</li> <li>20. Sustainability of natural, human. and built environments {B,C,D}</li> </ol>

## Currently Identified WSU Research Strengths

College/Campus	Theme / Goal
<b>College of Education</b>	<ol style="list-style-type: none"> <li>1. STEM education</li> <li>2. Measurement and evaluation</li> <li>3. Cultural and linguistic diversity</li> <li>4. Leadership and innovation in teaching and learning</li> <li>5. Health and wellness</li> <li>6. Cultural studies in education</li> <li>7. Management and socio-cultural studies of sport</li> <li>8. Students with disabilities</li> <li>9. Neuroscience/neuropsychology of education</li> <li>10. Educational technology</li> <li>11. Human-animal interaction</li> </ol>
<b>College of Medical Sciences</b>	<ol style="list-style-type: none"> <li>1. Sleep</li> <li>2. Cancer</li> </ol>
<b>College of Nursing</b>	<ol style="list-style-type: none"> <li>1. Behavioral Health and Addictions</li> <li>2. Community and Public Health</li> <li>3. Educational Innovations and Outcomes</li> <li>4. Patient Care Safety and Quality</li> </ol>
<b>College of Pharmacy</b>	<ol style="list-style-type: none"> <li>1. Genomics/Genetics</li> <li>2. Drug Discovery</li> <li>3. Quantitative Systems Pharmacology</li> <li>4. Multidisciplinary Health Outcomes Research/Epidemiology</li> </ol>

## Currently Identified WSU Research Strengths

College/Campus	Theme / Goal
<b>College of Veterinary Medicine</b>	<ol style="list-style-type: none"> <li>1. DNA organization, repair, and chromosome biology</li> <li>2. Global Animal Health</li> <li>3. Individualized Medicine</li> <li>4. Immunology and Infectious Disease</li> <li>5. Reproductive and developmental sciences</li> <li>6. Systems Neurosciences</li> <li>7. Tissue Bioengineering and Remodeling</li> </ol>
<b>Murrow College of Communication</b>	<ol style="list-style-type: none"> <li>1. Health promotion, media literacy, applications of new technologies to health promotion and health literacy</li> <li>2. Political communication, e-democracy, civic engagement and public affairs</li> <li>3. Science communication and risk communication</li> <li>4. Media psychology and communication processes and effects</li> </ol>
<b>Voiland College of Engineering and Architecture</b>	<ol style="list-style-type: none"> <li>1. Bioenergy and Catalysis</li> <li>2. Advanced Materials</li> <li>3. Power Engineering</li> <li>4. Air/Water</li> <li>5. Machine Learning – Smart Environments</li> </ol>
<b>WSU Vancouver</b>	<ol style="list-style-type: none"> <li>1. Neuroscience - in particular, in the areas of hearing and addiction</li> <li>2. Environmental Science - in particular, in the area of watershed science</li> <li>3. Math and Science Education</li> </ol>

## RESEARCH THEMES SUBMISSIONS FROM FACULTY WEBSITE

I limit my comments to the Condensed Matter Category where I have some experience. There are a number of research areas within Condensed Matter that I think should be highlighted in the document produced. The public and our administration are somewhat aware of many breakthroughs and new developments in materials, structures, and applications that have potential broad reaching impact. Relating new positions to economic, technological, and societal (ETS) concerns seems to me useful in getting people's attention. I would like to suggest some areas that we should consider highlighting. (Note: most need a sentence or two on their utility in terms of future applications; also, many overlap with chemistry, biochemistry, engineering, computer science, etc. which MIGHT be beneficial to mention). Importantly, all of these areas can be linked to particular ETS needs of our nation. Here are a few:

- Alternative Energy
- Medical Physics
- Biomaterials
- Biosensors
- Innovative Electronic Materials
- Nanotechnology (fits into almost everything listed)
- Soft Materials (e.g., polymers, amorphous materials, highly (.....'really highly') viscous fluids)
- Photonics
- Climate Change
- Meta-Materials

In almost, if not all, of these areas there is fundamental science (including electronic, optical, mechanical and thermal properties of 'something') that is a necessary component of any study of interest.

It's my opinion that there is considerable value in seeking candidates who do in fact link strongly to such areas. It may not last, but currently higher education is being pressured to put out students that are 'competent' (read: 'can contribute to the ETS national needs—well actually, get a job at Google). At the moment the concern is primarily at the undergraduate level but it could creep upwards.

2) I am more than a little cynical about this initiative, because as always it privileges a set of fields and perspectives over and against others, prioritizing research that makes money reinforces the status quo, or otherwise affirms common sense. I mean WSU has hired folks to do things, who have strengthened in certain areas (surprise those will be areas for future research). Moreover, WSU has tasked some units with subsidizing this unilaterally crafted program (teach a bunch student over there in CAS while we do important research). Guessing this political economy is not up for discussion.

Pretending this is not all rigged from the start, which requires an amazing suspension of disbelief, I would recommend that WSU become a leader in (a) the study of the material impacts of oppression and structural violence (everything from the ways street harassment and rape negatively impact women at WSU and beyond to the ways environmental racism and underdevelopment hurt communities of color

in the state; and (b) the prioritization of the knowledge of indigenous and radicalized communities in the USA (as opposed to the whitestream paradigms). Examining these issues would tie together folks in the biosciences, neurosciences, psychology, sociology, anthropology, history, and more. Just and sustainable societies is supposed be something WSU cares about; diversity is supposed to be something WSU cares about.

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3) Supporting international student support and retention across the disciplines

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4) Studying the societal effects of the general public self-educating on health related issues via the Internet. In addition, studying the effects of the general public accessing unregulated medical apps (that often are classified as "entertainment").

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5)

1. The impact of economic inequalities on human development in the 21st century
  2. Environmental impact of global population growth and its energy demands
- 

6)

- Science, Technology, and Society
  - Foundational Analysis of Public Policy Alternatives
  - Transnational Encounters and Interactions
- 

7)

- Substance Abuse and Addiction
  - Health Behavior
  - Prescription Drugs and Chronic Pain/Illness
- 

8)

1. Use of physiology in crop improvement
  2. Translating model system information to improve nutrient use efficiency in valuable plants
- 

9) From Dr. Chuck Benbrook, Research Professor, CSANR

At Chad Krueger's urging, I recently sent three ideas to Jim Moyer, for him to consider in the priority setting process he is engaged with. Thought I would share them here as well. Pardon a bit of inside baseball.

1. Soil health. The Soil Renaissance project is about 18 months old, and may be the effort that finally breaks through the various constraints holding back a serious increase in investments in promoting soil health. The Nobel Foundation, Farm Foundation, and Howard Buffett Foundation are behind the effort.

They are about 6-12 months from having their full recommended program done and launched. The expectation is that once this milestone is reached, the Buffett Foundation+Gates+Noble Foundations will announce a major new investment fund to jump-start the work both here and internationally. Figures like \$500 million have been thrown around, and would clearly be in the ballpark for anything that Bill Gates and Warren+Howard Buffett would call a “big” investment.

As will all such soil-focused efforts, the remaining hurdles are how to measure soil health, establish a baseline, set goals, and monitor progress. I have been involved because of my long-term interest in measuring soil quality. There are four task forces moving the work along; I am on the measurement task force, and it meets mid-Nov in Oklahoma, at the Nobel Foundation headquarters. The full group meets 12/3, a meeting I will miss. Obviously, no one knows how this will evolve, but I see a huge opportunity for WSU here, given the depth of the WSU bench on these issues.

2. Food safety. I was in DC for several days in Sept., and the word is there is going to be some substantial new investments by FDA, secondarily by USDA, in food safety related research to establish a credible science based for setting details of evolving FSMA regs. The biggest issues all involve the interface of crop farming, livestock/manure/compost, water quality, food safety. The needs/interests of small farmers and organic farmers will be given considerable focus in much of this work. I have several friends in DC that will be closely involved with the shaping of these research programs, and have been advised (in one case “begged”) to get involved. I could see the PNW emerging as the region driving much of the cutting edge work.

3. Dealing with GE ag issues/problems. There are huge issues/challenges arising in the wake of problems with current GE crops. These problems are most acute in the SE and Midwest, and are not really issues in the PNW. There are reasons land grants and scientists therein from the impacted areas generally stay away from these issues. If WSU has the will to take them on, there will be substantial funding to support needed work. I will be doing some via the M2M program. I have heard there are a few other key things going on, or in the planning stages (e.g., glyphosate testing in breast milk). This is an area crying out for a focused effort at a major land grant, or perhaps a consortia of land grants. If such a team/consortia came together, it is certain new research funds will find their way to it.

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10) The effects of aging on society. Interdisciplinary connections would include nursing, anthropology, business (particularly Hospitality Business Management), nutrition, and pharmacy.

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11) I would hope that some of the “grand challenge-like” themes for WSU would include creative artistic scholarship, perhaps an interdisciplinary approach to digital arts.

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12) WSU Research Theme: Smart Environments

Our society faces significant challenges in sustaining and improving the environments in which we live and work. For example, we need to provide for the health of the growing elderly component of our population. We need to provide security for the critical infrastructures of these environments. We need

to improve the efficiency of our resource utilization in order to sustain these environments in the face of ever-increasing demands on productivity and economic growth. At the same time, we also enjoy an unprecedented ability to collect large amounts of data from these environments, mine the data for new knowledge, and take actions to effect changes in the environments in order to improve safety, health and productivity. The goal of Smart Environments is to enable the environments in which we live and work to be safer, healthier and more productive through the use of intelligent data analytics and adaptive systems.

A multi-disciplinary team of researchers at WSU is already working on approaches to collect and analyze data in order to sustain and improve these environments. The WSU team is recognized both nationally and internationally for their accomplishments in these areas, and they have established significant interdisciplinary collaborations with other academic, industry and government institutions. In 2014, WSU formed the Smart Environments Research Center (SERC, [serc.wsu.edu](http://serc.wsu.edu)) to provide a focal point for this work, accelerate growth and collaboration, and further establish WSU as a leader in this area.

The Smart Environments research theme encompasses several disciplines with WSU. Collaborations have already been established across the College of Engineering and Architecture (Electrical Engineering and Computer Science, Mechanical and Materials Engineering, Chemical and BioEngineering, Civil and Environmental Engineering, and the Institute for Sustainable Design); College of Arts and Sciences (Economics, Mathematics, Psychology, Sociology); Veterinary Medicine (Neuroscience); Medical Sciences (Sleep and Performance Research Center); Nursing and Pharmacy.

Based on this initial success, multi-disciplinary focus, potential for growth, numerous funding opportunities and significant impact on society, we propose Smart Environments as a major research theme for WSU.

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13) Hello,

I think one area that would be of great importance is that of Evolutionary Medicine and Evolutionary Agriculture (I'm not sure the latter term exists in the current lexicon). By understanding the process of Evolution at the Genomic, Proteomic, Structural Biology, and Ecological (e.g. ecological speciation and adaptation) we can design tools to help develop treatment for disease and improve agricultural production.

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14) The average age of Americans is increasing and chronic conditions are becoming more prevalent. There is a need to improve the effectiveness of disease-prevention, to improve access to healthcare, and to sustain healthy independent living. At the same time there is an increased availability of new technologies and an ever-improving health information technology infrastructure. Advances in computer science and engineering coupled with the aforementioned needs of society suggest a ripe opportunity for the design and development of home or mobile technologies that enable functional independence and can improve quality of life for people with disabilities, chronic conditions, or mild impairments associated with aging. Home-health and mobile-health technologies are expected to function not only as monitoring devices, but as essential components in the delivery of healthcare.

Washington State University is poised to be an international leader in the area of designing technologies for healthy independent living. The innovations that are created here will not only spark an interest in students who want to serve society. They will also foster cross-disciplinary research; they will be supported by large organizations including NIH, NSF, DARPA, VA, and independent foundations; they will result in commercially-viable products; they will encourage faculty to tackle large research challenges; and they will allow the WSU community to provide solutions for a large problem of societal relevance.

To support this area, we recommend hiring individuals with expertise in computer science (particularly big data, mobile apps, machine learning, data mining, and embedded systems), bioengineering, clinical and experimental psychology, and medicine.

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15) Community based disease prevention through local adoption of evidence based techniques appropriate for rural communities in developing countries. Example is prevention of arsenic poisoning in Bangladesh through crop/animal consumption via soil and water contamination.

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16) RESEARCH THEME 120 Day. Mass Isotopomer Subcellular Analysis of Human Disease States with Emphasis on Lipid Dysfunctions. DJ Guerra Ph.D. October 2014

I'm interested in subcellular compartmentalization of biochemical networks as I think this maps onto the fate of the tissue/organ/organism. Peroxisomes serve several important functions in mammalian cells which include vital regulation of membrane assembly maintenance and turnover. These functions are served by a complete set of fatty acid oxidation enzymes and certain biosynthetic pathways including ether lipid (plasmalogen) synthesis and very long chain fatty acid metabolism to eicosanoids. Peroxisomes also oxidize fatty acids of the VLCPUFA classes and thus rebuild/turnover signaling membrane environments which can alter protein exposure to immune cells among other things.

Peroxisomes replicate autonomously and in this respect are more similar to endosymbiont organelles like mitochondria and chloroplasts. Their replication is not linked to cell cycle, but rather is controlled via endogenous protein translocation and membrane associated interaction. Indeed, peroxisomes are generated from the ER and in this regard are similar to the Golgi in having a half-unit membrane which is always closely linked to specific sub domains of the parent ER. This half-unit membrane enhances its sensitivity to lipid turnover at several orders of magnitude higher sensitivity than the double unit membrane of the mitochondria where people traditionally look for pathophysiological phenotypes.

In yeast, peroxisomes replicate according to a complex association of several membrane proteins (called PEXs') along with lipids synthesized in situ and regulated by phospholipid trafficking from a specific ER-compartment. This event runs like this PA $\Delta$ LPA $\Delta$ DAG. Once DAG is made it flip flops to the outer leaflet and causes cytoplasmic RHO GTPases to come along and either zip or unzip the membrane and cause either fusion or fission respectively.

Basically this is a movie of cellular dynamics that plays a role in cell integrity. Excess calories or sedentary lifestyle or aging as impacted by genomics and epigenetics would force the autoregulation of



peroxisomes to change the time signature on cell mortality and modality. This in turn could cause alternatively tumorigenesis, necrosis or senescence.

I'm getting interested in quantitative distribution of mass isotopomers in complex heteronuclear molecules. There are apparently some published algorithms that can be used to calculate how much stable isotope we would need to start with in order to examine the so called polymerization assemblages. Basically, the technique is to estimate a priori what fraction of molecules you will synthesize from a labeled precursor pool (eg  $^{13}\text{C}$  arachidonate) into complex lipids, lipoproteins, tissues or subcellular fractions enriched for peroxisomes, mitochondria, lipid bodies, plasmalemma, ER, Golgi.. Then you do the labeling and run a comparative analysis (either binomial  $\dots^{12}\text{C}$  vs.  $^{13}\text{C}\dots(^{13}\text{C}\pm^{12}\text{C})^2=^{13}\text{C}^2 \pm 2(^{13}\text{C})(^{12}\text{C}) + ^{12}\text{C}^2$  or multinomial expansion of the series and determine quantitatively the efficiency of net synthesis and turnover from some time point set arbitrarily at the beginning.

The core idea is to turn on the incorporation/enrichment of  $^{13}\text{C}$  essential vs. non-essential fatty acid into complex lipid fractions (i.e. PC, SM, PL, CE) within subcellular compartments in certain cell types either from plasma or biopsy. This is basically, a monomer $\rightarrow$ polymer expansion.

I see this being applied to fatty acid and sterol lipid dysfunction in type 2 diabetes and metabolic syndrome as associated with obesity.

But these are just sketches. I want to hear what you would like to see what others might like to do at the bench and importantly, at the clinical level since stable isotopes can be used in human research and therapy with no track record of iatrogenic pathology.

So, what might be one of your goals? After consultation with other researchers on campus and at the clinic, we agree on one or two of them and deduce a hypothesis to carry us down that road.

One could also envisage the production of a  $^{13}\text{C}$  mouse model (grown on  $^{13}\text{C}$  enriched fatty acid or  $\text{CH}_2\text{O}$  chow produced by the Vet Path Clinical Group) for metabolic studies as produced at WSU Spokane and sold to scientists nationwide.

17) Genome Sciences, Biotechnology and Biomedicine, Lead faculty: Mike Skinner, CAHNRS, College of Sciences, Vet School

18) Responding to the President's call to support and improve K-12 STEM (Science, Technology, Engineering, and Mathematics) education, as well as efforts at our own institution in this area.

19) FOLLOW-UP TO THE SUGGESTION: Responding to the President's call to support and improve K-12 STEM (Science, Technology, Engineering, and Mathematics) education, as well as efforts at our own institution in this area.

To be clear, I am advocating for educational RESEARCH in these areas, not just the acts of supporting and improving this work.

20) Targeted Drug Delivering using Nanotechnology.

Live animal imaging (intravital microscopy) to investigate pharmacology and physiology.

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21) Here at the WSU College of Veterinary Medicine, we have the unique advantage of being able to access a wide variety of animal models for research. With the growing concern of an influenza pandemic, we should take advantage of the pig, chicken, and horse models to study how recombination events occur. Viral co-infections or the passage from one animal to another may produce novel viruses due to antigenic shift that could ultimately be more deadly to humans.

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22) "Truly sustainable small and urban agriculture for rural economic development" -- A focus on true sustainability, rather than specific production practices (i.e., organic, biodynamic, global GAP) for small and urban farms and agricultural businesses. This particular area is in desperate need of not only basic science research behind effectiveness of different practices, but we are greatly in need of economic and social impact studies of the influences of these enterprises on rural development. HOWEVER, THE EMPHASIS TRULY SHOULD FOCUS ON SUSTAINABLE (i.e., don't make the theme just another plea for organic, because organic is not always sustainable in all crops or agricultural settings).

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23) There are a few people in the university who are studying different aspects of the legalization of marijuana and its impact on Washington State (in Criminal Justice, Psychology and Chemistry that I know of). I have heard that the U of W is really getting into this research. More research should be supported in this area as soon as possible at WSU or we will be left behind!

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24) Biorenewable Chemicals and Materials: This theme includes the significant work in Aviation Biofuels (funded by NARA and FAA) as well as historical strengths in biocomposites (CMEC) and biopolymers -- including the newly funded NSF I/UCRC named the Center for Biopolymers and Biocomposites (CB2).

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25) Developing Sustainable Computing systems: Multicore chips to High-Performance Computing Platforms.

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26) I suggest: "Fueling the future". This is broader than biofuels, yet encompasses biofuels. It would also include solar energy, wind energy, advanced fuel cells, nuclear power, fixing carbon dioxide to fuel, and the development of advanced technologies to better recover and use fossil fuels.

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27) Developing Sustainable and Intelligent Infrastructure - integrate efforts from Civil Engineering, Environmental Engineering, Materials Sci. & Eng., Mechanical Engineering, Electrical Eng., Computer Science, Economics, etc.

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28) "Human and Environmental Health". This topic encompasses two of the greatest challenges facing our society - challenges that must be addressed independently and in concert with one another. This subject would advance the medical research programs in Spokane, CVM and Engineering, as well as linking health to the environmental work in engineering, CAS, and CAHNRS.

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29) Interprofessional health care education (class & simulation) to provide fluid educational model.

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30) Overall topic: Health promotion

Sample specific topics: physical activity and the built environment, community influences of risk behavior, family communication for health promotion, adolescent and young adult substance use.

This broad topic leaves room for identification and understanding of contextual factors of health (and risk) and then program implementation to address these factors and promote health.

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31) I am a Plant Pathologist and am not trained to culture animal cells but the theme I am suggesting would require assistance from researchers so trained. My lab has identified a signal, a fungal DNase that activates an immune response in plants that develops complete resistance to some plant pathogens. The gene for DNase has been transferred to tobacco constructed behind a pathogen inducible promoter. The social resistance to GMOs in plants prevents us from using it in commercial plantings of plants. It functions by causing mild DNA strand nicking allowing the stalled transcription complexes to transcribe genes, which in plants are mainly defense genes. I have no idea if a similar response exists in animal cells. If it does, it would be possible to transform cells in the intestinal linings. The benefits would depend on what target cells and which microbial pathogens might be suppressed. In plants we use Agrobacterium and sometimes E coli to transfer genes to the plant cells - using a process called Agro-infiltration to carry out this sometimes time limited transformation.

Obviously, there is a lot of background work required. I will not have enough years remaining to cover much of it. If anyone expresses an interest in this wild idea I will provide them with the background data we have collected. Lee Hadwiger Plant Pathology

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32) Implications of Economic Downturns & Upswings for Health, Wealth, and Work

- Ben Cowan, CAHNRS (health economics; labor economics)
- Bidisha Mandal, CAHNRS (public health and health-related decision making; consequence of job loss and fear of job loss on mental health)
- Renee Magnan, Psychology (health decision making: understanding the role that affect (e.g., worry) plays on health decisions and behavior (e.g., smoking cessation, exercise, cancer screening)
- Tahira Probst, Psychology (health and safety outcomes of job insecurity and economic stress)
- Amy Wharton, Sociology (work-family balance)

Likely many more potential collaborators throughout the WSU system...

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33) My idea is Developing Economic Ecosystems. Combining research efforts in engineering, business/entrepreneurship, social sciences, office of commercialization and possibly education, WSU can make a difference in the economic structure of the region and beyond. Successful economic ecosystems have advantages for the health of the state. Beyond that, communities where entrepreneurship thrives have lower crime and higher educational attainment. Research at the K-12 level can explore how financial literacy provided from early stages not only improves students' awareness, but early research is showing that when the students come home and ask parents about financial literacy it impacts parents' choices. This would be a very broad research agenda encompassing everything from the creation of new IP that drives new business opportunities, to understanding how entrepreneurs change the social, economic and cultural communities, to exploring the economics of entrepreneurship as the engine for developing a successful economic ecosystem. The newly formed Hoops Institute for Taxation could take a lead to drive new research on entrepreneurship and taxation. There is nothing else similar in the nation. A strong entrepreneurship effort is occurring at Vancouver with the Business Growth Mentor and Analysis program. This is involving students, community professionals, faculty and others to drive economic growth for small and minority owned businesses. See this link: <http://business.vancouver.wsu.edu/bgmap>. They are branching out to build a research faculty and also a community educational forum which is designed to be a foundation for building new research ideas. There are opportunities for faculty to collaborate to explore crime and new business formation, building receptive communities for new tech startups, and all the respective aspects of building economic ecosystems and their impact.

Just an idea. Hope it helps stimulate your thinking about developing a distinctive WSU research focus.

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34) Changing the way we treat our crops

Sprayers are used to apply chemicals in every commodity and style (i.e. organic or conventional) we grow. Too often growers rely on outdated technology and only respond to regulations. Spraying impacts our food safety, food supply, environment, worker safety, marketing, and technology development. There are many solutions being developed, but not adopted. To make large impacts this area needs a team of biologists, engineers, Extension faculty, economists, and social scientists. We must not only overcome the issues associated with poor precision application from the machine, but also human error and worker contamination. For example, some workers have been exposed because they did not want to leave the field due to fear of getting in trouble. We are at a critical point where farmers and faculty must acknowledge this issue to maintain global competitiveness, high quality of product, and consumer acceptance.

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35) Diversity of diversities. New and emerging areas of human differences recognized as being tied to rights and full participation in society (homosexuality, disability, non-binary gender) creates new challenges and tensions for everything from the philosophy of diversity to the implementation of public programs. For example, rights for homosexual individuals are often established through the argument

that "it is not a choice" but religion, marital status and even disability are often choices. Does this mean they are less entitled to protections and privileges of diversity?

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36) Establishing a renewable hydrogen economy in the Inland Northwest is a grand challenge that integrates WSU's key strengths, while developing an energy economy that will drive research for decades to come.

Hydrogen is the fuel of our food and our vehicles- hydrogen's primary use is the production of ammonia fertilizer, the most energy intensive process on the planet. Hydrogen is also used for the production of biofuels from cellulosic feedstock. A rapidly growing use of hydrogen is to power forklifts for food distribution centers and backup power. All of these uses are key here in the inland northwest.

Despite the integral role that hydrogen plays in the Inland Northwest economy, we do not generate hydrogen here, despite our ample supplies of renewable hydroelectric and wind energy. Hydrogen generation can substantially increase the value of renewable energy. Hydrogen is worth more than electricity and can be used to load-level the intermittency of renewable energy supplies. For example, the Wild-horse wind farm has between 300-700 MW of installed generation capacity that is valued at only 50 MW due to wind fluctuation. Power-to-gas hydrogen technologies increase the reliable power produced and generate a higher-value energy product.

Currently, WSU has just 1 researcher dedicated to hydrogen technology (Jacob Leachman in MME). So although there is significant potential in this area, we do not have a research group capable of pursuing this.

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37) Materials for Energy Applications

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38) Unmanned aerial systems

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39) Health Care Access, Utilization and Cost in an Era of Federal and State Health Reform, involving researchers from the Department of Health Policy and Administration, the College of Nursing, the College of Pharmacy, the School of Economics, the Foley Institute, and the Departments of Political Science, Sociology and Psychology.

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40) Energy Storage, Conversion, and Efficiency: next generation batteries, fuel cells, and capacitors; functional materials for energy applications; lightweighting with composite materials; renewable fuels; computational modeling of energy materials.

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41) Dear Dr. Keane,

I am interested in proposing the following areas to be considered. Though some of these fields have already been attained considerable prominence at WSU, I believe these research areas are still in

priority. There will be opportunities for many Researchers from several Departments for participation and also for international collaborations if these fields will be strengthened further. Please consider selecting one or two areas from my suggestions.

- 1) Program on developing pharmacological approaches to contraception and fertility control in pets, wildlife and humans. Contraception and Infertility: Global challenges.
- 2) Research focus on placental growth, development and function. It envelops the areas of stem cells and differentiation, nutrition, immunology and environmental factors. It will address the consequences of early embryonic death, abortion, pre-eclampsia, IUGR and pre-term delivery in humans and animals.
- 3) Research focus on ovarian function and early embryonic development, using dairy cattle as a biological model for reproduction in agricultural species and humans.
- 4) Impact of environment on reproductive function. Enhancing agricultural animal reproductive efficiency for stress environment.
- 5) Program on early, non-invasive and sensitive biomarkers discovery in Animal health and Diseases with the special emphasis on reproductive diseases.

Thank you very much,

Sincerely,

Vanmathy

Vanmathy Kasimanickam DVM, MS.

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42)

1. Clean Technology, i.e. Renewable Biofuels and Bioproducts; Sustainable Design; Smart Grid; Advanced Materials; Precision Agriculture, Air and Water (e.g., Lab for Atmospheric Research, Water Research Center, Soil and Water research in CAHNRS, etc.)
  2. Basic and applied plant science
- 

43) Theme Topic:

Financial Engineering and Risk Management

This topic has a broad impact on education and research. It involves cross disciplinary fields including mathematics, statistics, finance and risk management as well as global economics.

I am currently working on a proposal to establish such a research center.

Sincerely,

Hong-Ming Yin

Department of Mathematics and Statistics.

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44) Using, preserving and reusing Big data.

## Sustainable Digital Heritage Curation.

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45) Research on supporting and improving K-12 and undergraduate STEM (Science, Technology, Engineering, and Mathematics) education and the engagement of historically underrepresented populations in STEM education.

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46) I feel we should have a team of researchers and Extension which focus on livestock grazing and water quality along with forage health, reduced erosion and resistance to climate change. We can also involve the biologists that deal with impacts on wildlife (e.g. bird) populations, soil health, water quality, livestock health, pasture management, forage management. This has been one of the most promising issues that would be resistant and aid us in the future on climate change.

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47) Reproductive Health as a “Grand Challenge-like Theme” for WSU research

Michael Griswold, Regents Professor and Jon Oatley, Director Center for Reproductive Biology

Reproductive health has a vast societal impact. Of prominent importance are the psychological hardships of infertility, the need for safer and more effective contraceptives, and improved understanding of the potential effects of environmental exposures on reproductive health. For both human and animal populations, successful reproduction is the key to genetic integrity, sustainability, and diversity in the next generation. Moreover, the efficient generation of food animals by maximizing reproductive capacity is an essential part of feeding the ever-expanding world population. It may come as a shock to some to realize that WSU is considered by many authorities to be among the top institutions in the world in research on reproductive health. Prof. Richard Schultz, a VP for research at the University of Pennsylvania in a recent recommendation letter stated, “From my perspective Washington State University has one of the strongest programs in the country, if not the world, in reproductive sciences.”

The program in reproductive health has grown slowly but steadily over the years. The Center for Reproductive Biology (CRB) at WSU was borne almost two decades ago out of a recognized need to elevate the prominence of reproductive sciences within the US and, in particular, in the Pacific Northwest. The CRB, with 85 current members, has been instrumental in fostering research and educational collaborations for investigators who study various aspects of reproductive processes. These investigators are located three WSU campuses across several colleges (College of Veterinary Medicine, CAHNRS, and College of Arts and Sciences) and at the University of Idaho. Collectively, these research efforts have and continue to provide new methods for diagnosing and treating reproductive health issues and improving animal agriculture.

The primary mission of the CRB is to be a nationally and internationally recognized center of excellence for research and education in the reproductive sciences by fostering collaborative interactions among members. Future goals include expanding the breadth of the collaborative research and education

ventures of the CRB beyond the basic sciences and to: 1) more rapidly translate new research findings to clinical practice, 2) influence policy decisions on issues that impact human reproductive health, and 3) identify important new areas of research that should be emphasized in educational and funding initiatives at both the state and federal level.

Within the College of Veterinary Medicine, CAHNRS, and the College of Arts and Sciences, WSU has numerous full professors and junior faculty funded to do research in several aspects of reproductive health including Down Syndrome, testes and ovarian function, environmental influences on reproduction, and contraception. We have 3 former Presidents of the (SSR) Society for the Study of Reproduction (no other institution has more), several winners of the SSR research award, several winners of the SSR young investigator award and the Andrology Society young investigator award. We have one winner of the SSR Hartman award that is the single highest award given by SSR. We currently have the editor of the Biology of Reproduction journal in the Department of Animal Sciences. The two major research awards in the College of Veterinary Medicine were won by reproductive biologists this year.

Whenever President Lane Rawlins addressed the press or the legislature about WSU research, he always highlighted our expertise in reproductive health. In one of his State of the University addresses President Rawlins placed reproductive biology research as number one in his listing of top ten accomplishments. Despite the fact that we have not had that level of visibility with the current WSU president, we have continued to build the quality of the program where WSU is still generally considered to be one of the top institutions in the world in Reproductive Sciences. Indeed, if just the top 10 WSU investigators in this field are considered, they direct NIH programs funded by more than \$5 million in direct costs annually. Because of the number of established investigators in this field, research collaborations are common. Two prominent SMB investigators just received an outstanding fundable score (3 percentile) on a joint NIH proposal.

The focus on reproductive health aligns perfectly with WSU's land grant mission, the missions of several WSU colleges, and the ambitions of its new medical school. Most importantly, reproductive health impacts agriculture, medicine, and general well-being of humans and animals making this a strong and logical area on which to focus WSU's research effort.

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#### 48) Sleep and Circadian Health Factors

Krueger

- Frank
- Panksepp
- Van Dongen
- Wisor
- Belenky
- Karatsoreos
- Szentirmai
- Davis



- Kapas
- Vila
- Gerstner
- Peixoto

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49) Nanoscale Science and Engineering  
Materials for tomorrow

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50) Recruitment and retention of underrepresented students in the STEM and STEM Education disciplines

Delivery of undergraduate and graduate student instruction that is engaging, develops conceptual knowledge, and develops students' ability to transfer their learning to novel contexts + support of faculty professional development and instructional improvements that improve their effectiveness in teaching these students.

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51) All campus collaborative research for fast reaction to infectious disease. This could involve everyone from Apparel and Merchandise Design, Arch. to Psychology, to Global Animal Health, to Engineering.

Happy to discuss -- Chuck Pezeshki, Professor, School of MME

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52) I believe that "Health and wellness" could be an overarching theme and "grand challenge" for the university, given the increasing concerns in the US regarding physical activity and health (e.g., obesity rates), mental health or psychological well-being, and the interaction of the two. Indeed, isn't the health and wellness of the US population as central a goal as any other that might emerge from our search for grant themes? Research in several departments would be relevant, including psychology (in Arts and Sciences), counseling, kinesiology, and exercise science (in Education), nursing, human-animal interaction (multiple colleges), the forthcoming medical school on the health sciences campus, neurosciences (e.g., the biological substrates of physical and psychological health and well-being). The "business" of health and wellness and sociology (e.g., SES differentials in health and wellbeing) are further potential fields that could fall under this overarching theme.

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53) Sustainable Materials and Energy

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54) Microbiomes: Food Productivity and Global Human/Animal Health

For years, microbes have had a bad name in that they are known to cause diseases. They are something to be scrubbed away, things to be avoided. However, it is becoming clear that beneficial microbes play crucial roles in plant growth, soil fertility and human and animal health. It is estimated that there are 100 trillion good bacteria that live in or on the human body (i.e., ten times as many microbial cells as

human cells). Similarly it is estimated that millions of microbes thrive in and on plants, but not much is known about their beneficial effects or how to optimize microbiomes for agricultural productivity and human/animal health. NIH, NSF, USDA and DOE are beginning to recognize the importance of microbiomes and are beginning to increase funding in this area. WSU should consider emphasizing multi-investigator, inter-disciplinary projects to better understand the beneficial effects of microbes. This will require projects involving departments such as Horticulture, Crop Science, Soil Science, Food Science, Animal Science and Plant Pathology in CAHNRS; School of Biological Sciences in CAS; and Global Animal Health in the College of Vet Medicine. Discoveries in these areas could have revolutionary impacts on global food production and improving human and animal health.

Joe B.W. Poovaiah

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509-595-8813 (cell)

<http://molecularplants.wsu.edu/calcium>

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55) Biomedical Nanotechnology

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56) Functional Materials for Energy and Biomedical Applications

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57) I have two suggestions for the Research Themes Subgroup to ponder:

1. A specific research theme - Developing Health Informatics solutions. As an emerging area of importance, the theme ties together efforts involving researchers from computer science, math and statistics, global animal health, pharmacy, nursing, electrical engineering (sensors and embedded devices), and soon to be established WSU health science program in Spokane.
2. A core, fundamental, and enabling theme needed across the university - Computational and Data Science expertise and infrastructure. The world is moving towards a data driven society. Many solutions to grand challenge problems require access to and manipulation of large amounts of data collected in all different domains ranging from commerce to security to science to agriculture and beyond. We are just beginning to figure out how to manage such large data, how to make sense of it, and how to apply it to advance different disciplines. Data science addresses domain specific problems with respect to Big Data management, Data analytics, Data mining, Data modeling, Data visualization, and Data driven decision-making. Data science is highly interdisciplinary and happens at the intersection of 3 areas: Computer science, Math & Statistics, and Domain expertise (global animal health, agriculture, business, and science such as chemistry, physics, material, and health to name a few).

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58)

- Planning for resilience in the face of changing water cycles due to climate change
- The water-energy nexus: Hydrology of renewable and nonrenewable energy production
- Coastal and freshwater eutrophication
- Effects of emerging contaminants on human health and ecosystem function
- Freshwaters as key components of the global climate system
- Trans-boundary waters and national security
- Water and equity: Distribution of water and ecosystem services associated with water
- Water resource management for ecosystem services: agriculture, cities, resilience
- Water resource management for global human, animal, and ecosystem health
- The water-food nexus: Hydrology links crop and livestock yields, nutrient cycling, and soil sustainability in rain-fed and irrigated agricultural systems
- The Columbia Basin and the Puget Sound: Laboratories for agricultural and urban sociohydrology
- Institutional development in maturing water economies
- Stormwater policy, technologies, product development and extension education

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59) The brain and society.

Water and upstream sustainability.

Social justice in environment/community.

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60) I am suggesting an interdisciplinary focus on brain and society

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61) Interdisciplinary research: such as on Vancouver campus, Nursing, Ed, Social Work joins in project working on The Effects of Pediatric Medical Home for Children with Special Health Care Needs.

Also: ED and Nursing and IT joining forces to research development of curriculum thread for all WSU health professions programs, to include Medical home concepts so that we are producing new clinicians who already "know" how to provide this type of care.

Data mining or secondary data research or more Health Services type research cluster work "Subgroups" using the technology, ED, Nursing: there is a great deal of need around Electronic Health Record.

Kathy Willits Associate Professor College of Nursing,

PhD Health Service Research

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62) WSU Research Grand Challenge:

Water Research for Sustainability and Resilience

Water is integral to every biological process on earth and is critical in myriad ways for human welfare. Water is a necessary foundation for food and energy production, and water access and quality is a fundamental determinant of human health. Water provides valuable ecosystem services and recreation benefits, but also plays a central role in hazards such as flooding, landslides, wildfire, and sea level rise. The hydrologic cycle plays an important role in both responding to and driving global change. Far-reaching implications include those for air quality, climate, and the health of the biosphere.

An environment in flux calls for new science with a new vision for scientific pursuit. WSU has a strong foundation for providing high marginal benefit and cost-effectiveness through a sharper focus on and additional investment in water research. A WSU grand challenge, Water Research for Sustainability and Resilience, provides a framework to investigate water in the many ways that it affects and shapes society and the environment. This broad and integrative theme would enable researchers across the university to identify collaborative overlap, and would provide the potential to greatly strengthen WSU's existing capacities and reputation in this crucial research area. This grand challenge may be delineated into the following themes, while recognizing that there is strong overlap between them such as through the water-food-energy-environment nexus.

Theme 1: Water quantity and quality. In much of the arid western United States, surface water is more or less fully appropriated, groundwater declines are widespread, snowpack as a storage mechanism is threatened by climate change, and water quality declines due to nutrient leaching, stormwater runoff, and other contaminants such as endocrine disruptors all have important consequences for economic growth, resilience, and sustainability, and are inducing important management and policy changes in response. Washington State's diverse and changing climate and demographics, from west to east, are a microcosm of these global changes. However, human history shows an astounding potential for technological development and institutional change in the face of challenges, with numerous opportunities that may be developed through new research activities. Research in this theme focuses on water supply, demand, and contamination issues and their solutions by integrating physical and natural sciences with engineering and the social sciences.

Theme 2: Excess water, hazards, and infrastructure. When in excess, water can become catastrophically destructive. The 1948 Columbia River spring flood caused major damage along the entire river and completely destroyed Vanport, a major city in Oregon; the 1964 Columbia River Treaty, which is currently in review, arose to a large extent because of this event. Water also weakens the structural properties of our soils. In March of 2014, the Oso mudslide in western Washington State engulfed an entire neighborhood, killing 43 people. Climate change (with the associated potential for more frequent and intense extreme events), continued population growth and development of our state and region, and our aging infrastructure together result in a critical vulnerability of our society. Research in this theme focuses on emerging approaches to design, maintenance, and preservation of both physical and institutional infrastructure to increase the resilience of built and managed environments to global change.

Theme 3: Water and the inter-connected Earth system. Water and energy drive the connections between land and atmosphere, land and ocean, and the shallow subsurface and deep subsurface. In a warming world, the hydrologic cycle is intensifying and atmospheric circulation patterns are shifting,

with cascading impacts. A warmer atmosphere holds more water vapor, further enhancing the greenhouse effect, and resulting in the potential for more frequent and extreme droughts and storms. Humans are also directly impacting the hydrologic cycle through changes in land use, emissions of aerosols that can affect precipitation formation, and water resources development (dams, diversions, groundwater abstractions, etc.). These changes in the hydrologic cycle can result in numerous and sometimes drastic impacts to society and the environment. For example, warming coupled with more extreme droughts increases the vulnerability of our forests, rangelands, and croplands, causing them to be more susceptible to disease and invasive species. Research in this theme seeks to understand the Earth system “as a system”, necessitating tight collaborations between, e.g., atmospheric scientists, hydrologists, ecologists, economists, and social scientists to characterize these linkages and to develop strategies that promote adaptation to global change while minimizing unintended consequences.

Theme 4: The water-energy nexus. Energy and water are tightly inter-dependent. Water is used to produce electricity through cooling thermal power plants (accounting for 39% of all freshwater withdrawals in the United States) and through hydropower generation, an important source of renewable energy. The Grand Coulee Dam on the Columbia River is the largest hydropower producer in the United States; in 2013, Washington State was the leading producer of hydropower in the country. Furthermore, pumped-storage hydroelectricity is the largest-capacity form of available grid energy storage; water is pumped to higher reservoirs during periods of excess generation capacity and released for generation during periods of higher energy demand. Hydraulic fracturing provides the economic benefits of readily accessible hydrocarbon-based fuels, but at the expense of depletion and contamination of our freshwater. Water is a critical input in the production and processing of biomass feedstocks for energy. Conversely, energy is needed to make clean water accessible and to protect our environment, as energy is required to transport and treat water for municipal and industrial purposes both before and after use. This research theme brings together water resource, environmental, power, and computer science engineers with economists and other social scientists to find solutions that jointly promote water and energy sustainability.

WSU researchers have been very successful in recent years acquiring and carrying out water-related research. Indeed, we have approached the full capacity of our faculty and broader research community to develop water-related grant proposals, complete awarded grant research, and publish. WSU is increasingly recognizing the importance of water research, education, and outreach. For example, CAHNRS has recently identified water as a primary “Emerging Theme”, while VCEA has identified air and water resources as one of its top three “Signature Areas” for strategic investment. This is a clear indication, and recognition at the college level, that WSU is poised for substantial gains from additional investment in water research and education, and that the marginal gains in terms of research, education, extension, and extramural funding from investments can be large, and these college-level efforts should be pursued as part of a larger Grand Challenge vision at WSU.

Investment in water research should come in several forms, with the broader mission of WSU as a Land Grant University in mind. The short list of recommendations below is not exhaustive, and some of them were recommended to CAHNRS as part of a report submitted by the Dean’s Taskforce for Water Resource Management, completed in April of 2014.

First, WSU needs to recognize and act on a need for heightened university-wide coordination around water activities. The funding environment increasingly prioritizes interdisciplinary research projects that involve large research teams with tightly integrated research, education, and outreach activities. Water research is at the forefront of this transition, as achieving water sustainability and resilience requires this broad participation. Land-grant universities, in particular are well poised to solve problems related to water sustainability, in large part due to a long history of involving stakeholders in solution-based research activities (Gold et al. 2013). Efforts at coordination such as this can benefit from a clear leader. The State of Washington Water Research Center (SWWRC) is an ideal entity to provide leadership in building these important connections within WSU. Housed in the WSU Office of Research, it can act as a clearinghouse and driver of water research across the university community in coordination with other centers (CEREO, CSANR, ESIC, IGIS, IMPACT, ISD, WSC, etc.). Beyond WSU, the Center is a member of the National Institutes of Water Research, which provides an ideal foundation for collaboration across the United States and beyond.

Second, WSU would benefit from more coordinated graduate education and training in water research. The Oregon State University Water Resources Graduate Program (<http://oregonstate.edu/gradwater/>); University of Idaho Waters of the West (<http://www.uidaho.edu/cogs/envs-wr/academics/water-resources/wow-integrated-basin-analyses>), Colorado State Water Resources and Management Program (<http://www.online.colostate.edu/topics-of-study/water/>) and other universities have integrated water resource management programs. A water-focused curriculum or set of programs at WSU would help focus student attention, recruitment, and retention of students interested in water resource management. Students in water-focused graduate programs would in turn help support faculty in productive research and education endeavors. Limited development of such an integrated water program could be done with relatively limited additional resources, but a more extensive integrated water curriculum would require additional teaching capacity.

Third, new hires are needed to complement and supplement the existing capacity in our water research community to allow WSU to capitalize on existing and future research opportunities and challenges. While there are myriad needs, some of the most pressing needs are in the areas of watershed and water resources processes, planning, and management; groundwater and vadose zone hydrology and conjunctive use; applied climatology and atmospheric dynamics; ecohydrology, ecological engineering, and green infrastructure; and water law, economics, and political science; all with an emphasis on scientists with proven capacity for integrative thought and vision.

The tightly coupled nature of humans and our critical water resources, and the overlying context of global change that is already resulting in crucial vulnerabilities to societies globally and within our state, call for renewed scientific vigor. Washington State University is poised to produce strong results from additional investments in water research. Water Research for Sustainability and Resilience is a Grand Challenge for WSU.

Reference:

Gold et al., 2013, Advancing water resource management in agricultural, rural, and urbanizing watersheds: Why land-grant universities matter. *Journal of Soil and Water Conservation*: doi:10.2489/jswc.68.4.337

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63) Imagine this scene: I'm a self-identified Hispanic elementary-aged student and my principal is a young, energetic white woman. I'm a self-identified African-American middle school-aged student and my principal is a stern but caring middle-aged white man. I'm a self-identified Native American high school-aged student and my principal is a young, enthusiastic white man.

How come I never see people who look like me, talk like me or live in a community like mine lead my school?

I wonder if I could ever be a school leader because I never see any people like me leading in my school. Then add the dismissal retention rates for newly hired principals to this scene. Fuller and Young (2009) examined retention rates in Texas high schools from 1996-2008 and found that less than 30 percent of newly hired principals stay at the same school for five years (University Council for Educational Administration).

I believe that WSU could create a unique collaboration among university recruiters, research faculty across many disciplines (such as teaching and learning, educational leadership, business, communications, etc.) and school district leaders by considering a mentoring program that could grow our own educational leadership graduates into a cadre of mentors for future WSU educational leader students.

Research foci could be in areas:

- that examine the systemic educational issues that can inhibit underserved populations from considering leadership roles and that can limit implementation of in-service education and mentoring programs that support success for newly hired educational leaders
- that quantify graduation rates and retention in hired educational leadership positions of WSU educational leader graduates
- that study the effectiveness of WSU preparation programs with the potential to assess programmatic effectiveness and affect change as indicated by the data
- that study the effectiveness of mentoring programs and processes for newly hired educational leaders
- that study the potential of university and school district joint ventures to offer mentoring programs including instruction for both mentees and mentors of educational leaders.
- that could lead to new course offerings and internships designed in collaboration with recruiters, research faculty and school districts

References:

Brown, K. M., & Wynn, S. R. (2009). Finding, supporting, and keeping: The role of the principal in teacher retention issues. *Leadership and Policy in Schools*, 8(1), 37-63.

Fuller, E. J., & Young, M. D. (2009). Tenure and retention of newly hired principals in Texas. University Council for Educational Administration, Department of Educational Administration, University of Texas at Austin.

Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover?. *American Educational Research Journal*, 41(3), 681-714.

Viadero, D. (2009). Turnover in principalship: Focus of research. *Education Week*, 29(9), 1.

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64)

- Bench to Bedside: Center Translational Medicine
  - Health for Every Body: Center for Personalized Medicine and Health Disparity Research
  - Healthy Aging: Center for Cancer, Aging, and Preventative Medicine
  - Wellness in the Inland Northwest (WIN): Nutrition, Exercise, Sleep, and Preventative Medicine
  - Wellness for Life: Reproduction, Development, and Healthy Aging
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65) Health services research/large data mining which could be cooperatively used to look at multiple issues of concern including health outcomes and measures, pharmacoeconomics and medication safety, utilization of services in health care reform under the ACA, health disparities etc.

Small business development and ethical issues inherent in scaled down enterprises which may be exempt from larger regulatory structures

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66) Brain and Society—a cluster of faculty all interested in the intersection of neuroscience with other disciplines, such as criminal justice, psychology, and art. For example, research on drug abuse might involve a neuroscientist studying how cells in the brain respond to drugs, while a criminal justice researcher might study ways in which our judicial system can better intervene to prevent relapse to drug-taking, using information gleaned from neuroscience research. Psychologists would study how to best design interventions to help drug users in recovery, and artists might create art around drug taking and addiction recovery, or study how drug culture permeates artistic works. Together, these collaborations will enrich our academic culture and better tie in diverse research towards broad societal goals.

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67) I think a research theme on water and watersheds is well-merited based on the need, existing strengths, and potential for WSU to be a world leader in this area.

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68) Materials for Tomorrow

Nanoscale science and engineering

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## 69) Proposed research theme: "Big Data Initiatives for Life Sciences"

## Overview

WSU needs a prominent presence in Big Data Science and Analytics. WSU already has strong programs in a number of data-driven areas including (but not limited to) life sciences, physics/astronomy, chemistry, climate and atmospheric research, advanced materials, and smart power grid. Nevertheless, with many of these data-rich domains experiencing unprecedented growth in complex data, largely accelerated through an increased adoption of high-throughput technologies, it has become imperative to harness sophisticated computational tools that are capable of scaling to large data sizes and are also clever in the use of innovative algorithms to mine for information and insight, and generate testable hypotheses. Big Data science is emerging as an overarching cross-cutting theme that brings together data scientists, statisticians, informatics experts, algorithm and software developers, high-performance computing experts alongside application domain scientists. Funding agencies including NIH, NSF and DOE have invested significantly in Big Data research over the last few years. New Big Data communities focused on particular grand challenge domains (e.g., brain connectomics, cancer genome atlas; human microbiome) are starting to form and organize across the nation. To be successful at WSU we must prioritize efforts towards an environment that embraces a trans-disciplinary setting with engagement from experts spanning physical and life sciences, engineering and computer science as equal partners.

## Grand challenges in life sciences:

WSU already has mature and world-renowned programs in agriculture, veterinary medicine, and global animal health, and a medical college will soon be established. Investments have already been made in the procurement and deployment of high throughput technologies such as next-generation DNA sequencers for genotyping and genome sequencing, on-field/clinical instruments for massive scale phenotyping, and mass spectroscopy instruments for proteomics, lipidomics, metabolomics and tissue imaging. These investments offer a unique window of opportunity to address grand challenge questions in plant and animal sciences (as identified by NRC) within the context of WSU's existing research strengths. Examples of such grand challenges include:

- a) (Genomes to Phenomes) What are interaction mechanisms between genomes, phenotypes and environments, and how could the knowledge about these mechanisms be used to increase crop yield/productivity while responding to a changing climate (e.g., drought and heat tolerance, water/nutrient use efficiency)? These questions are central to crop and horticulture scientists at WSU. Similarly, for veterinary scientists, how does a pathogen that affects cattle evolve over time, how does it interact with the host genome and environment, or when does it become virulent or obtain antibiotic resistance? When and how do strictly animal pathogens become zoonotic?
- b) (Biomedical research & health informatics) With a growing presence in biomedical sciences and medicine at WSU, several Big Data problems and opportunities such as personalized medicine, microbiome, and decoding brain connectome are imminent. These entail utilizing and leveraging our growing presence in clinical health records, medical imaging, brain and neuro-imaging, sleep studies, pharmacogenomics, and cancer genomics.

To address grand challenge questions such as these, we need teams of experts from diverse backgrounds (in engineering, sciences and computing sciences) and with common interests and shared vision to converge under one umbrella of Big Data Science. This can happen only with a deliberate, institutional and a concerted support, with sustained investments in the Big Data Science area including (but not limited to) facilitating existing faculty, recruiting additional expertise, and building infrastructure capacity. WSU should also leverage these efforts with regional partners including Pacific Northwest National Laboratory, University of Idaho, and University of Washington. Finally, an institutionally supported Big Data Science initiative focused on a WSU core area of excellence will advance the university's strategic goal to enhance its position of leadership in high-performance scientific and data-intensive computing.

Core faculty & colleges (research thrusts in braces):

VCEA:

- Ananth Kalyanaraman, EECS (bioinformatics; HPC)
- Shira Broschat, EECS (Bioinformatics)
- Assefaw Gebremedhin, EECS (data science; HPC)
- John Miller, EECS (bioinformatics)

CAS:

- Joanna Kelley, Biological Sciences (ecological genomics)
- Omar Cornejo, Biological Sciences (population genomics)
- Asaph Cousins, Biological Sciences (plant phenomics)
- Eric Roalson, Biological Sciences (phylogenetics)
- Kevin Vixie, Mathematics (pure & applied geometric analysis; data science)
- Bala Krishnamoorthy, Mathematics (optimization; computational topology; data science)
- Snow Wang, Mathematics (mathematical biology; biological modeling)
- Christian Mailhiot, Shock Physics (materials genome; HPC)

CAHNRS:

- Dorrie Main, Horticulture (plant genomics; databases)
- Amit Dhingra, Horticulture (plant genomics and biotechnology)
- Kulvinder Gill, Crop & Soil Sciences (wheat genetics)
- Zhiwu Zhang, Crop & Soil Sciences (plant phenomics)
- Dave Brown, Crop & Soil Sciences (soil sensing; spectroscopy)

CVM:

- Kelly Brayton, Veterinary Microbiology and Pathology (tick-born pathogen)
- Douglas Call, Global Animal Health (antibiotic resistance; vaccine dev.)
- John Wyrick, Molecular Biosciences (bioinformatics)

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70) Grand Challenge research theme: "Institute for Matter in the Extreme (IMaX): Harnessing extreme environments to accelerate materials design and discovery"

Submitted by: Christian Mailhiot, christian.mailhiot@wsu.edu

## Overview: Establishing WSU as a leader in the field of matter in the extreme

Materials are central to every aspect of global competitiveness and drive technological advances in energy, environment, global security, and human welfare. The design, discovery, development, and deployment of advanced materials can be significantly accelerated by replacing lengthy and costly empirical studies with predictive and experimentally validated mathematical models and computational simulations, through advances in computational and experimental tools, adaptive cyber-infrastructure, more effective use of standards, and enhanced data management. This overarching vision was put forward by a recent Presidential Initiative and documented in the June 2011 interagency report, entitled “Materials Genome Initiative (MGI) for Global Competitiveness” (Report of the OSTP, June 2011).

As a subset of the materials innovation enterprise, the establishment of a fundamental knowledge of the properties of materials in extreme environments underpins the process for optimizing the performance, safety, reliability, and sustainability of components and systems for end-use applications characterized by extreme operating conditions. For example, future energy and environment technologies will place increasing demands on materials’ performance with respect to extremes in stress, strain, temperature, pressure, chemical reactivity, photon or radiation flux, and electric, magnetic, or optical fields (Report of the DOE Office of Basic Energy Sciences, February 2008). Moreover, at the heart of the field of materials development also lies a “Big Data” challenge: data of large scale and complexity are being generated through experimental methods, advanced imaging instruments, and computational simulations.

In the context of the surge in national awareness for the need to develop the tools, infrastructure, and future workforce to accelerate the materials’ “design-discovery-development-deployment” cycle, the unifying theme for the proposed Grand Challenge research effort is the investigation of the fundamental structure-properties-performance relationships of materials in extreme environments for end-use applications where extreme operating conditions co-exist. A special emphasis will be on the nonlinear and synergistic effects of combined extreme conditions on complex systems. Moreover, the establishment of a scientific basis to harness extreme environments to control states of matter for the design of materials with optimized properties underpins our scientific theme, informs our vision, and guides our proposed training and research program. Our vision is to develop the next-generation leaders in the science of materials in extreme environments and to catalyze and advance leading-edge interdisciplinary research through the establishment of a focused program that integrates training in science and engineering across the disciplines of materials science, mechanical engineering, physics, chemistry, mathematics, and computer and computational science. Our goal is to advance the frontier of the field of investigation of materials in extreme environments through a focused Grand Challenge research effort. Moreover, such a research and training effort will equip students with the most comprehensive knowledge base to prepare them for careers in fields where the performance, reliability, and lifetime of materials and their ability to operate under extreme conditions drive the development of novel materials, components, and systems in existing or emerging technologies. Partnership opportunities for WSU include a broad spectrum of industrial sectors — energy, environment, transportation, high-performance computing and communication, micro- electronics, nanoscale science and technology, etc. — as well as federal national laboratories.

WSU has established a set of unique core competencies and structural organizations in support of a research theme focused on the investigation of states of matter in extreme environments. These include, but are not limited to: the Institute for Shock Physics (ISP), the Materials Science and Engineering Program (MSEP), etc. Examples of established and emerging research programs in the general area of materials properties and response in extreme environments include:

1. Thermo-mechanical extremes (Mailhiot, Yoo, Gupta, Hawreliak, McCluskey, Zbib): Thermal properties (equation of state) and constitutive properties (mechanical response) of materials, phase diagrams, strength, plasticity, fracture and failure.
2. Chemical extremes (Hippis, McEwen, Banerjee, Kruse, A. Clark, S. Clark): Surface processes, coupled chemical-thermomechanical-electromagnetic environments, solvation environments.
3. Radiation extremes (Zbib, McCloy, S. Clark): Microstructure evolution in radiation environments, microstructure-engineered materials for radiation-tolerant properties, radiochemistry, actinide chemistry.
4. Electro-optical (EO) extremes (I. Dutta): Materials in extreme electric fields, light-matter interactions, transport properties.

What is needed for WSU to grow a presence, and ultimately establish leadership, in this area is an institutionally supported structure — or possibly a new thrust area within an existing program, such as MSEP — to coordinate, integrate, and amplify current efforts and develop a unified strategy for leadership. Such a structure could be provided by an institutional thrust to establish an Institute for Matter in the Extreme (IMaX).

Establishing the WSU Institute for Matter in the Extreme (IMaX):

Our long-term goal for launching IMaX is to establish a flagship multidisciplinary program at WSU — with the possibility of forming an expanded consortium with other universities and non-academic research laboratories, as appropriate — on the investigation of materials and complex systems under extreme conditions. This emerging and nationally recognized research area builds on WSU's academic strengths and core competencies in materials science and engineering, physics, chemistry, shock physics, compression science, mathematics, and computer and data science. Moreover, the launching of a signature cross-disciplinary research program in materials in extreme environments will transform graduate education and training at WSU by implementing a transformative graduate program to equip students with a comprehensive knowledge base and to provide them with the experimental, computational, and data science tools to apply this fundamental knowledge to areas of national interest in energy, environment, and global security.

The proposed focused Grand Challenge research effort in the investigation of matter in the extreme would initially leverage and enhance WSU's existing trans-disciplinary research programs, including, but not limited to:

1. Molecular processes under extreme chemical, thermodynamic, and electric field conditions (Hippis, McEwen, Kruse)
2. Quantum design and barochemistry for materials discovery: (Mailhiot, Yoo, McCluskey)
3. Liquid Metal Behavior Under Extreme Electrical and Optical Fields (Dutta)

4. Mesoscale modeling of microstructure evolution and deformation behavior in materials in extreme radiation environments (Zbib)

The above examples serve as an illustration of WSU's breadth in the area of materials and processes in extreme environments. An institutionally supported Grand Challenge research effort in this area will serve as the basis to amplify and unify existing efforts, as well as broaden the scope to other disciplinary fields of research and centers of excellence at WSU including energy and environment (CEREO, LAR).

Outreach activities and enhanced external opportunities form a pivotal core element of the proposed Grand Challenge research theme. Specifically, the IMax Grand Challenge program will enable access by participating WSU students to the unprecedented capabilities available within DOE and DoD research and national laboratory complex, as well as with industrial partners, for the investigations of materials in extreme environments. Partnerships between WSU and these organizations are already in place.

Partial list of Core faculty and Colleges (research thrusts):

CAS:

- Christian Mailhiot: CAS/ISP – Quantum simulation of matter, quantum design of materials
- Yogendra Gupta: ISP – dynamic compression
- James Hawreliak: ISP – laser-driven dynamic compression high-energy density materials science
- Choong-shik Yoo: ISP/Chemistry – high-pressure chemistry
- Matthew McCluskey: Physics – high-pressure research, semiconductor physics
- Aurora Clark: Chemistry – computational chemistry, solution chemistry, interfacial chemistry, actinide chemistry
- Sue Clark: Chemistry – radio-chemistry, actinide chemistry
- Kerry Hipps: Chemistry – Scanned probe imaging of molecular processes at surfaces in chemical and electric fields
- M. Valipuram: Mathematics – Mathematical and computer modeling of nonlinear phenomena.

VCEA:

- Indranath Dutta: MME – Investigations of electromigration processes in extreme electro-optical fields
  - Ananth Kalyanaraman: EECS – Computer and data science / High-performance computing
  - Jean-Sabin McEwen: Voiland School of Chemical Engineering and Bioengineering – Ab initio simulations of catalytic processes at surfaces under extreme conditions
  - Norbert Kruse: Voiland School of Chemical Engineering and Bioengineering – heterogeneous catalysis
  - Hussein Zbib: MME – Simulation of microstructure evolution on materials in extreme radiation environments
  - John McCloy: MME – Ceramics, amorphous materials, magnetism
  - Soumik Banerjee: MME – computational nanoscience for advanced clean energy technologies
  - Sinisa Mesarovic: MME – Multiscale modeling of thermomechanical properties of materials
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71) Earth, Ecosystems and Society (EES) is a research topic of significant strength at WSU, represented by the work and expertise of over 250 faculty from across the university system involved in the Center for Environmental Research, Education and Outreach (CEREO), the State of Washington Water Research Center (SWWRC), the Center for Sustaining Agriculture and Natural Resources (CSANR), the Institute for Sustainable Design (ISD), the Washington Stormwater Center (WSC), and the Institute for Global Innovation Studies (IGIS). Specifically, EES encompasses research on studies of the Earth, natural and managed ecosystems, ecosystem services, and the social and human dimensions of environmental change. Functionally, EES activities are adaptive and nimble, encompassing an interdisciplinary cadre of faculty from across the WSU system and allowing the institution to respond to large multidisciplinary funding opportunities on increasingly complex environmental challenges. For example, human alterations of nutrient and water movement through ecosystems is a topic that has attracted major funding (USDA, NSF) to WSU by galvanizing highly interdisciplinary networks of researchers, educators and extension professionals across campuses and involving the College of Education, College of Arts and Sciences, College of Agricultural, Human, and Natural Resource Sciences, Murrow College of Communication, and the Voiland College of Engineering and Architecture. Future EES work will be strengthened by increasingly coordinated, system-wide approaches to computing, data management, and other aspects of data-intensive environmental research and training.

WSU has highlighted and invested in three land-grant-related areas of strength at WSU. Together, Global Animal Health, Clean Technology, and Food and Agriculture all have a common underpinning: sustainable environmental systems. Inasmuch as functioning environmental systems are essential to the success of the other areas, WSU should parlay its existing and emerging capacities, related to the environment, into a complementary area of strength under the EES concept.

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72) Data-intensive environmental research is a strength in which we should make significant investment as soon as possible. WSU has made a lot of smart individual faculty hires in the past decade, building up impressive capacity for data-intensive environmental research across units and campuses (e.g., CAS, VCEA, CAHNRS). We have brought in individual faculty who not only fulfill traditional departmental needs but also emphasize modeling, programming and statistics in their research and teaching, and move comfortably in "big data" discussions. However, without system-wide approaches to supporting data-intensive research, these data-intensive research and teaching efforts are highly fragmented, with individual faculty largely devising their own solutions for compute power, data management and archive, networking, student training, and IT staff support. Funding opportunities for data-intensive environmental research are increasing rapidly, and funders are requiring greater attention to rigorous application of best practices in data management and computing. In my opinion, the collective energy exists right now to generate a cohesive system-wide effort in support of data-intensive environmental research, with conversations already active among initiatives such as the Water Research Center, the Center for Environmental Research, Education and Outreach, the Institute for Shock Physics, Civil and Environmental Engineering, School of Biological Sciences, the Department of Mathematics, the College of Veterinary Medicine, and others.

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73) Grand Challenge research theme:

"Establishing the WSU Center for Scientific and Data Computing (CSDC): Propelling WSU within the rank of the top 10 public universities in scientific and data computing within 10 years"

Submitted by: Christian Mailhiot, christian.mailhiot@wsu.edu

Overview: Building WSU's capacity to lead in high-performance scientific and data-intensive computing

High-performance scientific and data-intensive computing increasingly fuels the engine of scientific discovery and underpins the national research enterprise at all levels. Washington State University (WSU) is embracing scientific computing in all aspects of research, innovation, and education by (1) enhancing the availability of high-performance scientific and data-driven computing to researchers; and (2) training the next-generation leaders who can both advance scientific computing and apply its unprecedented power to address emerging grand societal challenges. To integrate scientific and data-driven computing into all current and future research activities across the WSU system, we propose the establishment of the WSU Center for Scientific and Data Computing (CSDC) — an institutionally supported initiative supporting the Grand Challenge Research Theme of advancing high-performance scientific and data computing with a focus on high-impact application domains consistent with WSU's areas of strength. The vision of the Center for Scientific and Data Computing (CSDC) is to propel WSU within the top 10 ranked public universities in the field of high-performance scientific and data computing research and education within 10 years.

The overarching vision for CSDC is to:

1. enhance WSU's leadership in scientific and data-intensive computing research, innovation, discovery, and education and be recognized as one of the top-10 public universities in the field of scientific and data computing within 10 years;
2. establish WSU as a pre-eminent destination of choice for researchers to advance the state-of-knowledge in the fields of scientific computing and data-driven science and apply their power to further WSU academic strengths, priorities, strategic goals and objectives, and regional and national impact;
3. grow WSU into a hub for innovation, entrepreneurship, and economic development in the Northwest (NW) region through high-value partnerships with regional national laboratories, leading academic institutions, supercomputer technology providers, and the Washington state and NW-regional industrial sector through the establishment of the Pacific Northwest Supercomputing Center (PNSC).

"One initiative / One university": A unified system's approach to academic and research computing:

The CSDC is the foundation to unify and enhance current scientific and data-intensive computing research programs across the WSU system through the implementation of a scientific vision, a hiring plan, and an acquisition strategy to deploy a system-wide and shared cyber-infrastructure that is responsive to the enduring and emerging need of the university's research community.

To fully advance WSU's leadership role in the area of scientific and data computing, the university must integrate the needs and requirements of the research community across its campuses. At WSU/Pullman,

utilization of scientific and data computing resources is pervasive across virtually all Colleges and academic units. Foremost among these are the College of Arts and Sciences (CAS), the Voiland College of Engineering and Architecture (VCEA), the College of Agricultural, Human, and Natural Resource Sciences (CAHNRS), and the College of Veterinary Medicine (VetMed). Moreover, a surge in demand for data-intensive computing is expected from the WSU/Spokane campus with the planned establishment of a medical school. Similarly the CSDC will reach out to the WSU/Vancouver and WSU/Tri-Cities campuses to develop a system-wide and unified strategy.

As the needs and requirements for scientific and data computing grow at an accelerated rate across the geographically distributed WSU system, it is important to establish a mechanism to coordinate and grow a cyber-infrastructure in response to these needs and develop an thoughtful investment strategy for the future. The proposed CSDC will form the basis for such coordination and integration of needs across the WSU system.

Relationship with existing programs, Centers, and Institutes:

Because scientific and data computing cuts across essentially all aspects of the university's academic, research, and administrative activities — and underpins all scientific disciplines at WSU — the CSDC must establish synergies and partnerships with existing Programs, Centers, and Institutes. Consequently, the CSDC will serve as a university resource to enhance research productivity and offer educational and academic opportunities, across the WSU system. Examples of Centers, Institutes, and Program that will benefit from an institutionally shared and scalable HPC/data computing resources include, but are not limited to, the Institute for Shock Physics (ISP), the Materials Science and Engineering Program (MSEP), the School of Biological Sciences (SBS), the Genomics and Bioinformatics cores, the Institute of Biological Chemistry (IBC), the Agricultural Research Center (ARC), the Laboratory for Atmospheric Research (LAR), the Energy Systems Innovation Center (ESIC), the proposed Center for Interdisciplinary Statistical Education and Research (CISER), the Center for Environmental Research, Education and Outreach (CEREO), etc.

Forging regional alliances: Establishing the Pacific Northwest Supercomputing Center (PNSC)

The establishment of strategic regional alliances is a central element to achieve the goals of the CDSC to grow WSU as a pre-eminent destination of choice to advanced high-end scientific and data-intensive computing. Consequently, WSU is reaching out to regional partners to establish a signature facility where resources are shared and leveraged with the objective of advancing simulation and data science to the benefit of the region and the nation.

As a hub for higher education, technological innovation, and economic development, the Pacific Northwest region would benefit greatly from a strategic, integrated, and coordinated approach to fully harness the surge in capacity and capability afforded by the rapid advances in the field of high-performance computing. The Pacific Northwest Supercomputing Center (PNSC) — a flagship regional alliance of WSU, the Pacific Northwest National Laboratory (PNNL), and the University of Washington (UW) — would provide a strategic approach to research and education in this key technology and its applications. The PNSC vision is (i) to enhance scientific productivity by providing the research community with shared access to large-scale, high-performance computing and data resources, and (ii)



to train the next-generation leaders who can both advance scientific computing and apply its unprecedented power to address emerging scientific and societal challenges. At its core, the PNSC serves as the foundation for a shared vision to advance—and ultimately define—research and education in high-performance simulation- and data-intensive computing; catalyze new collaborative partnerships; incubate multi-disciplinary initiatives and programs; and capture emerging funding opportunities. The PNSC would be a PNNL-hosted shared facility that realizes the economies of scale in computing resources, support infrastructure, system administration, and operations.

The PNSC Center has three strategic objectives:

1. Accelerate the rate of scientific discoveries by providing shared, large-scale, and scalable HPC resources and infrastructure to the research community well beyond what is currently available.
2. Transform training and education in high-performance scientific and data computing.
3. Advance computing architectures and environments through partnerships with technology providers.

The proposed CSDC will be the organization that coordinates WSU's interactions with the PNSC at all level of management, leadership, and operations.

Partial list of Core faculty and Colleges (research thrusts):

WSU/Pullman:

CAS:

- Christian Mailhiet: CAS/ISP – Quantum simulation of matter, quantum design of materials
- Aurora Clark: Chemistry – Chemistry in aqueous environment, radio-chemistry
- Kirk Peterson: Chemistry – Computational chemistry
- Michael Forbes: Physics – Many-body nuclear theory
- M. Valipuram: Mathematics – Mathematical and computer modeling of nonlinear phenomena.
- Joanna Kelley: School of Biological Sciences – Evolutionary and Population Genomics
- Omar Cornejo: School of Biological Sciences – Evolutionary Genomics and Population Genetics

VCEA:

- Ananth Kalyanaraman: EECS – Computer and data science / High-performance computing
- Larry Holder: EECS – Computer and data science
- Diane Cook: EECS – Artificial intelligence, machine learning, data mining, robotics, smart environments, and parallel algorithms for artificial intelligence
- Assefaw Gebremedhin: EECS – Data science, high-performance computing, graph algorithms and their application in computational sciences, network science, and optimization
- Chen-Ching Liu: EECS – Smart Grid
- Brian Lamb: Department of Civil & Environmental Engineering (LAR) – Laboratory for Atmospheric Research (LAR)
- Stephanie Hampton: Center for Environmental Research, Education and Outreach (CEREO) – Environmental research
- Jean-Sabin McEwen: Voiland School of Chemical Engineering and Bioengineering – Ab initio simulations of catalytic processes at surfaces under extreme conditions

- Hussein Zbib: MME – Simulation of microstructure evolution on materials in extreme radiation environments
- Soumik Banerjee: MME – computational nanoscience for advanced clean energy technologies
- Sinisa Mesarovic: MME – Multiscale modeling of thermomechanical properties of materials

## CAHNRS:

- Michael Kahn: Institute of Biological Chemistry / Associate Director, Agricultural Research Center (ARC) – Metabolomics
- Dorrie Main: Department of Horticulture – Bioinformatics
- Mark Lange: Institute of Biological Chemistry – Metabolomics
- Zhiwu Zhang: Department of Crop & Soil Sciences – Statistical methods and computing tools for genomic research and applications
- Zhihua Jiang: Department of Animal Sciences – Comparative genome biology
- Amit Dhingra: Department of Horticulture – Tree fruit genomics, gene expression and genome manipulation
- David Gang: Institute of Biological Chemistry – Plant Specialized Metabolism

## VetMed:

- Doug Call: School for Global Animal Health – Molecular epidemiology

## Information Systems / IT:

- Tony Opheim: Assoc. Vice President for Infrastructure – Infrastructure, Network Operations

## WSU/Tri-Cities:

- Joseph Iannelli: MME – Computational fluid dynamics

## WSU/Spokane:

- Ken Roberts: WSU Medical Sciences – Acting dean of the WSU College of Medical Sciences.
- Gary M. Pollack: Dean of the College of Pharmacy and vice provost for WSU Health Sciences
- Saleh Elgiadi: Executive Director – Information Technology Services
- Andrea Lazarus: Assistant vice president for research clinical health sciences
- Cindy Corbett: College of Nursing
- Kenn Daratha: College of Nursing
- Tamara Maryon Odom: College of Nursing
- Sterling McPherson: College of Nursing
- James M. Krueger: Regents Professor and Associate Dean for the College of Medical Sciences

## WSU/Vancouver:

- Christine V. Portfors: School of Biological Sciences
- Tracy Klein: College of Nursing

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74) Health outcome improvements using technology: web or mobile health patient engagement. Involve nursing, medicine, health sciences and communications experts.

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75) Emergent Computational Paradigms

This area would give WSU a unique opportunity to be a trailblazer in an exciting new area. This research theme includes neural networks, which can draw from the expertise of people in neuroscience and mathematics; algorithms, which covers people in the Math department and Engineering; quantum computing, which has experts in physics; and materials for such applications, which includes Materials Science, Biology, Chemistry, and Physics.

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#### 76) Fundamental Science

Focusing large numbers of researchers on a particular application can lead to success in driving a technology to market. However, transformative breakthroughs enable unanticipated technologies that leapfrog the typical incremental progress of most research. WSU should allocate a fraction of its budget to hire truly exceptional people in areas of basic research without a particular technological focus. This paradoxical themeless theme would enhance WSU's reputation far more than incremental work in established areas. It would also make WSU more AAU-like.

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#### 77) Research Theme: Early Life Environment and Acute and Chronic Health - Setting the Stage for Success

Societal challenge: Incidence and prevalence of many health conditions continue to remain unacceptably high both in developed and developing countries. Emerging data suggests that the genesis of many of these poor health outcomes originates from myriad physical and behavioral exposures very early in life. For example, exposure to some drugs in utero can increase a woman's risk for developing cancer. Similarly, having been breastfed reduces a child's risk for type 2 diabetes. Some of these negative effects even span multiple generations. Understanding how this early-life programming occurs is the first step in being able to prevent these factors from having often irreversible impacts on short- and long-term health and well-being.

Ultimate goal of research theme to society: The long-term goal of research conducted in this area would be to improve global human health through understanding (and manipulating, if possible) environmental (modifiable) factors that predispose individuals to health (wellness) and/or disease.

Current expertise within WSU: Faculty working in this area: Pat Hunt (SMB), Mike Skinner (SBS), Tom Spencer (Animal Sciences), Shelley McGuire (SBS), Erica Crespi (SBS), Courtney Meehan (Anthro), Jennifer Zambriski (SGAH), Tom Powers (Human Development), Ruth Bindler (Nursing), Brad Gaolach (Extension), education faculty?, music faculty?, arts?, others in Anthro?, cancer researchers?, psychology?, pharmacy faculty?, others in SGAH?

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#### 78) Environment and Human Behavior Interactions - going both ways: The impact of the environment on human health and behavior and the impact of humans on the environment

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79) Vancouver campus--Healthy Aging in Place (brings together HD, Nursing, Engineering, Public Affairs, Computer Sciences, built environment, anthro (potential)...There is a tsunami of aging people in our area and we have an interest from many players.

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80) \*\*\*\* Revised / Updated / October 14, 2014 \*\*\*\*

Grand Challenge research theme:

"Establishing the WSU Center for Scientific and Data Computing (CSDC): Propelling WSU within the rank of the top 10 public universities in scientific and data computing within 10 years"

Submitted by: Christian Mailhiot, christian.mailhiot@wsu.edu

Overview: Building WSU's capacity to lead in high-performance scientific and data-intensive computing  
High-performance scientific and data-intensive computing increasingly fuels the engine of scientific discovery and underpins the national research enterprise at all levels. Washington State University (WSU) is embracing scientific computing in all aspects of research, innovation, and education by (1) enhancing the availability of high-performance scientific and data-driven computing to researchers; and (2) training the next-generation leaders who can both advance scientific computing and apply its unprecedented power to address emerging grand societal challenges. To integrate scientific and data-driven computing into all current and future research activities across the WSU system, we propose the establishment of the WSU Center for Scientific and Data Computing (CSDC) — an institutionally supported initiative supporting the Grand Challenge Research Theme of advancing high-performance scientific and data computing with a focus on high-impact application domains consistent with WSU's areas of strength. The vision of the Center for Scientific and Data Computing (CSDC) is to propel WSU within the top 10 ranked public universities in the field of high-performance scientific and data computing research and education within 10 years.

The overarching vision for CSDC is to:

1. enhance WSU's leadership in scientific and data-intensive computing research, innovation, discovery, and education and be recognized as one of the top-10 public universities in the field of scientific and data computing within 10 years;
2. establish WSU as a pre-eminent destination of choice for researchers to advance the state-of-knowledge in the fields of scientific computing and data-driven science and apply their power to further WSU academic strengths, priorities, strategic goals and objectives, and regional and national impact;
3. grow WSU into a hub for innovation, entrepreneurship, and economic development in the Northwest (NW) region through high-value partnerships with regional national laboratories, leading academic institutions, supercomputer technology providers, and the Washington state and NW-regional industrial sector through the establishment of the Pacific Northwest Supercomputing Center (PNSC).

"One initiative / One university": A unified system's approach to academic and research computing:

The CSDC is the foundation to unify and enhance current scientific and data-intensive computing research programs across the WSU system through the implementation of a scientific vision, a hiring plan, and an acquisition strategy to deploy a system-wide and shared cyber-infrastructure that is responsive to the enduring and emerging need of the university's research community.

To fully advance WSU's leadership role in the area of scientific and data computing, the university must integrate the needs and requirements of the research community across its campuses. At WSU/Pullman, utilization of scientific and data computing resources is pervasive across virtually all Colleges and academic units. Foremost among these are the College of Arts and Sciences (CAS), the Voiland College of Engineering and Architecture (VCEA), the College of Agricultural, Human, and Natural Resource Sciences (CAHNRS), and the College of Veterinary Medicine (VetMed). Moreover, a surge in demand for data-intensive computing is expected from the WSU/Spokane campus with the planned establishment of a medical school. Similarly the CSDC will reach out to the WSU/Vancouver and WSU/Tri-Cities campuses to develop a system-wide and unified strategy.

As the needs and requirements for scientific and data computing grow at an accelerated rate across the geographically distributed WSU system, it is important to establish a mechanism to coordinate and grow a cyber-infrastructure in response to these needs and develop an thoughtful investment strategy for the future. The proposed CSDC will form the basis for such coordination and integration of needs across the WSU system.

Relationship with existing programs, Centers, and Institutes:

Because scientific and data computing cuts across essentially all aspects of the university's academic, research, and administrative activities — and underpins all scientific disciplines at WSU — the CSDC must establish synergies and partnerships with existing Programs, Centers, and Institutes. Consequently, the CSDC will serve as a university resource to enhance research productivity and offer educational and academic opportunities, across the WSU system. Examples of Centers, Institutes, and Program that will benefit from an institutionally shared and scalable HPC/data computing resources include, but are not limited to, the Institute for Shock Physics (ISP), the Materials Science and Engineering Program (MSEP), the School of Biological Sciences (SBS), the Genomics and Bioinformatics cores, the Institute of Biological Chemistry (IBC), the Agricultural Research Center (ARC), the Laboratory for Atmospheric Research (LAR), the Energy Systems Innovation Center (ESIC), the proposed Center for Interdisciplinary Statistical Education and Research (CISER), the Center for Environmental Research, Education and Outreach (CEREO), etc.

Forging regional alliances: Establishing the Pacific Northwest Supercomputing Center (PNSC)

The establishment of strategic regional alliances is a central element to achieve the goals of the CDSC to grow WSU as a pre-eminent destination of choice to advanced high-end scientific and data-intensive computing. Consequently, WSU is reaching out to regional partners to establish a signature facility where resources are shared and leveraged with the objective of advancing simulation and data science to the benefit of the region and the nation.

As a hub for higher education, technological innovation, and economic development, the Pacific Northwest region would benefit greatly from a strategic, integrated, and coordinated approach to fully harness the surge in capacity and capability afforded by the rapid advances in the field of high-performance computing. The Pacific Northwest Supercomputing Center (PNSC) — a flagship regional alliance of WSU, the Pacific Northwest National Laboratory (PNNL), and the University of Washington (UW) — would provide a strategic approach to research and education in this key technology and its applications. The PNSC vision is (i) to enhance scientific productivity by providing the research community with shared access to large-scale, high-performance computing and data resources, and (ii) to train the next-generation leaders who can both advance scientific computing and apply its unprecedented power to address emerging scientific and societal challenges. At its core, the PNSC serves as the foundation for a shared vision to advance—and ultimately define—research and education in high-performance simulation- and data-intensive computing; catalyze new collaborative partnerships; incubate multi-disciplinary initiatives and programs; and capture emerging funding opportunities. The PNSC would be a PNNL-hosted shared facility that realizes the economies of scale in computing resources, support infrastructure, system administration, and operations.

The PNSC Center has three strategic objectives:

1. Accelerate the rate of scientific discoveries by providing shared, large-scale, and scalable HPC resources and infrastructure to the research community well beyond what is currently available.
2. Transform training and education in high-performance scientific and data computing.
3. Advance computing architectures and environments through partnerships with technology providers.

The proposed CSDC will be the organization that coordinates WSU's interactions with the PNSC at all level of management, leadership, and operations.

Partial list of Core faculty and Colleges (research thrusts):

WSU/Pullman:

CAS:

- Christian Mailhiot: CAS/ISP – Quantum simulation of matter, quantum design of materials
- Aurora Clark: Chemistry – Chemistry in aqueous environment, radio-chemistry
- Kirk Peterson: Chemistry – Computational chemistry
- Michael Forbes: Physics – Many-body nuclear theory
- M. Valipuram: Mathematics – Mathematical and computer modeling of nonlinear phenomena.
- Joanna Kelley: School of Biological Sciences – Evolutionary and Population Genomics
- Omar Cornejo: School of Biological Sciences – Evolutionary Genomics and Population Genetics
- Bala Krishnamoorthy: Mathematics – Algebraic topology, combinatorial optimization, data science
- Kevin Vixie: Mathematics – Geometric analysis, data science

VCEA:

- Ananth Kalyanaraman: EECS – Computer and data science, bioinformatics, high-performance computing

- Larry Holder: EECS – Computer and data science
- Diane Cook: EECS – Artificial intelligence, machine learning, data mining, robotics, smart environments, and parallel algorithms for artificial intelligence
- Assefaw Gebremedhin: EECS – Data science, high-performance computing, graph algorithms and their application in computational sciences, network science, and optimization
- Chen-Ching Liu: EECS – Smart Grid
- Brian Lamb: Department of Civil & Environmental Engineering (LAR) – Laboratory for Atmospheric Research (LAR)
- Stephanie Hampton: Center for Environmental Research, Education and Outreach (CEREO) – Environmental research
- Jean-Sabin McEwen: Voiland School of Chemical Engineering and Bioengineering – Ab initio simulations of catalytic processes at surfaces under extreme conditions
- Hussein Zbib: MME – Simulation of microstructure evolution on materials in extreme radiation environments
- Soumik Banerjee: MME – computational nanoscience for advanced clean energy technologies
- Sinisa Mesarovic: MME – Multiscale modeling of thermomechanical properties of materials

## CAHNRS:

- Michael Kahn: Institute of Biological Chemistry / Associate Director, Agricultural Research Center (ARC) – Metabolomics
- Dorrie Main: Department of Horticulture – Bioinformatics
- Mark Lange: Institute of Biological Chemistry – Metabolomics
- Zhiwu Zhang: Department of Crop & Soil Sciences – Statistical methods and computing tools for genomic research and applications
- Zhihua Jiang: Department of Animal Sciences – Comparative genome biology
- Amit Dhingra: Department of Horticulture – Tree fruit genomics, gene expression and genome manipulation
- David Gang: Institute of Biological Chemistry – Plant Specialized Metabolism
- Kulvinder Gill: Department of Crop & Soil Sciences - Wheat genetics

## VetMed:

- Doug Call: School for Global Animal Health – Molecular epidemiology, vaccine development, antibiotic resistance
- Kelly Brayton: School for Global Animal Health – Veterinary pathology

## Information Systems / IT:

- Tony Opheim: Assoc. Vice President for Infrastructure – Infrastructure, Network Operations

## WSU/Tri-Cities:

- Joseph Iannelli: MME – Computational fluid dynamics

## WSU/Spokane:

- Ken Roberts: WSU Medical Sciences – Acting dean of the WSU College of Medical Sciences.
- Gary M. Pollack: Dean of the College of Pharmacy and vice provost for WSU Health Sciences
- Saleh Elgiadi: Executive Director – Information Technology Services

- Andrea Lazarus: Assistant vice president for research clinical health sciences
- Cindy Corbett: College of Nursing
- Kenn Daratha: College of Nursing
- Tamara Maryon Odom: College of Nursing
- Sterling McPherson: College of Nursing
- James M. Krueger: Regents Professor and Associate Dean for the College of Medical Sciences

WSU/Vancouver:

- Christine V. Portfors: School of Biological Sciences
- Tracy Klein: College of Nursing

81) For Research Themes, Innovation and Entrepreneurship are a critical piece of many of the areas already submitted, but are also key areas for research excellence in themselves.

82) I feel that the grand challenge themes should include at least one area that is sufficiently open-ended that it encourages basic research in a number of disciplines, coordination among which would be enhanced by the existence of the theme. One example of the sort of thing I have in mind comes from the general area of coupled natural and human systems (notably this is also the name for an NSF cross-cutting program): "surviving environmental change" which identifies the climatic and social conditions that have caused past and current societies to undergo dramatic change. This area involves research on many of the following areas: paleoclimates; paleoenvironments; possible existence of tipping points and early warning signs; historical demography; and so forth. It could involve faculty from a numbers of areas including Anthropology, School of the Environment, and some other faculty associated with CEREO. It would presumably include a forward-looking component as well, working on the problems of forming the sort of society we would prefer to live in even as the world undergoes expected significant climate change.

83) I suggest Drug Discovery as one of the major research themes in WSU. This subject will involve biology, chemistry, pharmacy and medicine, etc. multi-disciplines.

This research subject will benefit the whole society in the state, region and world. We can target various diseases, such as cancer, virus, bacteria, genetic diseases, neurological disease, Alzheimer disease and aging-associated diseases.

84) Education – STEM, access issues (elementary, college prices, on-line), human development, underrepresented communities

85) Outreach, Engagement, and Economic Development



86) Comparative analysis of doctoral prepared advanced care nurses in disease diagnosis and management of Medicare patients in comparison to physician (MD, DO) and patient outcomes

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87) Advancing the Forensic Sciences at WSU

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88) 1. National Security and Space Frontiers (CAS and CEA) and 2. Understanding Materials at Extreme Conditions (CAS and CEA)

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89) My Master's Thesis was named "Physical Growth of Alaska Native Children". I gathered data in Alaska in the summer of 1999. While the data was gathered almost 15 years ago the data is still good because it included children whose genetic makeup was strongly Alaska Native (Eskimo). I talked to the public health nurses in Alaska they were very excited about getting research related to how these children's growth is different from Caucasian children. My thesis covered only the Native children from birth to 2 years but I have data for children to 10 years old. My thesis is on file at the library of the WSU nursing and I will be in school and I would be very interested in discussing this topic with another researcher.  
Mina Normington, RN, MN

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90) Contemporary research, including humanities and digital humanities research, into cultural and ecological themes of Pacific Northwest literature and history, including Native American cultures. Another theme: basic humanities and digital humanities scholarship in a broader sense, including support for editions and DH work, which could build on WSU's preeminence in technology.

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91) "The Individual in the Modern Environment"

Theme:

Technological advances in the modern industrial era of the last two centuries have exposed humans to novel physiological and psychological challenges. The absence of prior exposure to such challenges renders us genetically and culturally vulnerable to negative health outcomes. The goal of this theme would be to investigate how modern environmental pressures such as the 24hr "always on the go" industrialized society, artificial light at night, the built environment, and the vast array of processed high-calorie foods interact to affect the health and wellbeing of individuals, from mental health, to metabolism, to immune function. The grand challenge is to discriminate between the positive influences and negative influences of technological modernization, and ameliorate the latter. Doing so will allow us to return to the trajectory of improved lifespan and quality of life that characterized the 19th and 20th centuries.

Strengths of WSU:

This "Grand Theme" would encompass research on all WSU campuses and several colleges. This would include basic and applied research in the CVM: Dept. of Integrative Physiology and Neuroscience (Sleep/Circadian rhythms, metabolism, brain and behavior, drug abuse), the Allen School and Dept. of

Immunology and Infectious Disease (the effects on immune function, infectious disease in animals and humans); CAHRNS: School of Food Science, Dept. of Animal Sciences (food quality, nutrition, sustainable processes); College of Arts and Science: Dept. of Psychology (behavior, decision making, addiction), Dept. of Economics (economic and business ramifications). Countermeasures and solutions to such problems would involve researchers in Architecture and Design, and Engineering – particularly in the design of built up spaces (homes, offices etc.) to better keep the environment in sync with the needs of the individual, and the individual in sync with the environment.

Iliia Karatsoreos (IPN, Pullman) and Jonathan Wisor (Medical Sciences, Spokane).

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92) Grand Challenge-Like Research Theme: "carpe diem, quam minimum credula postero"

(Seize the day, trusting as little as possible in the next day) Horace (Odes 1. 11)

Our most desperate hour is upon us. We know the cause and have the technical skills to reverse the coming apocalypse. Yet as a university we do nothing. We have a few years, 10 max, to curb our voracious appetite for non-renewable energy; should we fail in 50 years' time all life is doomed by the long-term irreversible effects of global warming driven by CO<sub>2</sub> and methane. Yes, consciousness and the gods it creates will be forever silenced. It is our duty to lead this fight; if not our university and its faculty then who? The bell tolls for you. Every college, every discipline can contribute; cross-discipline organization of research is necessary yet unorganized across the nation. We would be the first research one university as an organization to rise to meet this challenge with an effort integrating the range of disciplines from reproductive, political, and social behavior, to economics, to agriculture methods, to neurobiology, to medicine, to religion, to the music that so often celebrates life's pitfalls, challenges, and beauty. It will take strategic planning to form a rational program but it seems obvious that every discipline can directly contribute. The task is historic; we must begin or be disgraced and forever despised.

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93) Grand Challenge-Like Theme:

DISCOVERING THE FUNCTION OF SLEEP.

"Sleep that knits up the ravelled sleeve of care, The death of each day's life, sore labour's bath, Balm of hurt minds, great nature's second course, Chief nourisher in life's feast." – Shakespeare.

Sleep kindles the imagination and shapes the human condition, yet remains one of the greatest unsolved scientific mysteries. Sleep disorders and sleep insufficiency cost the US economy about \$150 billion each year and lead to pathologies ranging from cancer to cardiovascular disease. Sleep is essential for performance, learning, memory, mood, creativity, productivity, safety, health and well-being. Understanding the function of sleep is essential for alleviating the burden of inadequate sleep. It is also a key step toward understanding consciousness.

WSU is uniquely poised to take on this grand challenge. The Sleep and Performance Research Center is home to exceptionally accomplished and well-funded faculty from six different WSU colleges. They have developed the leading, most innovative, and most comprehensive theory of sleep function – a theory

that has captured the interest of the scientific world. Discovering the function of sleep is within WSU's reach.

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94) I would like to very summarily propose a "grand challenges-like" theme for consideration. It revolves around a simple but expansive concept: Diversity.

We may appreciate diversity in many contexts: genetic diversity in ecosystems, in our food systems, in the strategies we use to confront social and ecological change, and in the make-up of our social contexts. Yet, the study of diversity and, critically, an appreciation of promoting diversity, remains isolated and lacks integration, including in academia.

I see diversity as a potentially unifying theme university-wide, from genetics to international programs. In my own discipline, anthropology (and archaeology specifically), it has been shown again and again that diversity has been the fundamental basis on which solutions to human problems have been based. Critically, this theme can integrate basic research - which **MUST** be the core of any grand challenges effort - with a great range of applied efforts. Emphasizing diversity also makes a value statement that grounds us in our common humanity and ecological context.

Rather than elaborate on all the angles possible for such an initiative, I will plant the idea and see if it resonates with the committee. I will reiterate that the core of such a study - and any grand challenges-like theme - must be basic research.

Please let me know if elaborating on any of these points would be helpful.

Colin Grier, Associate Professor  
Anthropology, WSU Pullman

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95) **RENEWABLE ENERGY:** With global population growth, declining access to fossil fuels, and climate concerns, it is imperative that we consider renewable energy options. This technology touches on a variety of disciplines, including engineering, environmental science, chemistry, and biological systems. Although some renewable technologies have been used for hundreds of years, many modern versions are still in their infancy, providing opportunities for novel research.

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96) **WSU Research Grand Challenge: Sustainable Infrastructure**

Submitted by B. Muhunthan, Chair of CEE department.

It is well known that America is facing great challenges from severely deteriorated infrastructure. The American Society of Civil Engineers (ASCE)'s report card graded American's infrastructure around "D" in decades, which was mentioned numerous times in the presidential debates or State of Union. What makes it worse is the dwindling funds for infrastructure. As a result, Americans have to deal with potholes in cracked roadways, collapsed bridges, broken pipelines, flooded areas, crawling vehicles/trains, and so on, which directly or indirectly lead to fatalities. Durability is a key cornerstone of sustainability. Infrastructure directly impact people's living conditions and needs concerted efforts to

reverse the current trend and jump-start the next-generation infrastructure. This would warrant integrated and innovative approaches in fields of material, design, construction, management, economics, and human psychology, as well as modern technology.

WSU researchers have been at the frontline to build sustainable infrastructure through cooperation with industry, local, state and federal governments. The coherent efforts consists of multidisciplinary collaboration to develop systematic solutions as follows:

- a. Innovative policy and financing for infrastructure. The severely inadequate funds for infrastructure demands creative financing strategies, such as privatization, tolling, and alternative financing. The College of Agriculture's Freight Policy Transportation Institute is an exemplary entity to address such issues.
- b. Innovative and renewable infrastructure materials. Current infrastructure materials are expensive and non-renewables, which consume significant amount of energy and leave a significant environmental footprint. For instance, production of one ton of cement produces nearly one ton of carbon dioxide. WSU has been the leader in developing durable and renewable materials for infrastructure, such as bioasphalt by the Washington Center for Asphalt Technology (WCAT) or renewable bioplastics and bio-composites by the Composite Materials and Engineering Center (CMEC), which demonstrates our potential and leadership in this field. There are also ongoing WSU efforts in the value-added utilization of byproducts and waste in environmentally friend concrete materials.
- c. Sustainable design. Sustainable infrastructure design accounts for safety, energy efficiency, and livability. The Institute of Sustainable Design of WSU has be well recognized for its pioneering work in low impact development, sustainable transportation, and green buildings.
- d. Innovative construction. The infrastructure construction process can be accelerated to reduce the interruption of the public's life and save costs. Streamlined construction planning and innovative construction procedure could greatly reduce construction time from years to months and cut construction costs. The established construction engineering program of CEE and School of Design and Construction at WSU fit this challenge well.
- e. Smart infrastructure. Lives can be saved to avoid catastrophic failure of infrastructure. Smart structural health monitoring can detect the emerging risks or defects in the structures in early stage, while smart materials are capable of mitigating disasters and hazards and actively controlling structural behaviors. The unit like Smart Structures Lab of WSU can contribute to developing innovative infrastructure health monitoring and disaster mitigation technologies using smart materials and wireless communication systems.

In summary, WSU has played an essential role in the world to develop sustainable infrastructure technologies and can continue to contribute to this very challenging area.

Reference: American Society of Civil Engineers (ASCE), "Report Card for America's Infrastructure," <http://www.infrastructurereportcard.org/>

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97) While I applaud search for "grand challenge-like" themes to which WSU research can contribute, I would also like to note that it remains important to recognize and support the basic and applied research emerging from the numerous units and departments of the university. The ability to address larger questions from an interdisciplinary perspective builds from this fundamental work, but this work continues to require investment and support. Additionally, it is important to ensure that new "grand challenge-like" research themes represent truly interdisciplinary research programs that integrate the talents, expertise, and research of scholars that still have departmental/school homes. We should be cautious to not erect new multidisciplinary "silos" organized around a theme; multidisciplinary research is not always the same as collaborative interdisciplinary research.

That said, "Resilience" strikes me as a theme that many human and natural sciences can contribute to, especially if framed as the long-term exploration of human/ecosystem dynamics. This theme can explore the range of cultural practices and solutions that have permitted cultural groups to adapt (or fail to adapt) to ecosystem perturbations, and this can also be extended to many other species. This theme has the ability to bridge basic science that explores how this occurred in the past and how these dynamics are operating currently, while also having a predictive or applied capacity to model future conditions and propose particular applied strategies.

Thank you for your consideration. Andrew Duff, Associate Professor, Anthropology

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98) I think faculty at WSU are well positioned to make a global impact on interprofessional approaches to health care education and collaborative approaches to health care delivery. Significant funding opportunities exist for supporting research that meets the health care industry's triple aim of improving the patient experience of care, improving the health of populations, and reducing the per capita cost of health care. We already have experts in each of the health care fields on the WSU Spokane campus, and in collaboration with colleagues in Vet Medicine, we could answer the global call for better population based health.

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99) Dear Dr. Keane,

I would like to propose Interprofessional Health Sciences Education as a theme for innovative research at Washington State University. Currently there is an interprofessional (IP) team of faculty researchers at WSU Spokane working on a 3 year \$1.1 million awarded from the Health Resources and Services Administration (HRSA). Grant participants include faculty from nursing, pharmacy, medicine, nutrition/dietetics and social work (Eastern WA University). The grant entitled Using Interprofessional Education to Improve Care for Patients with Multiple Chronic Conditions was awarded with the aim of assembling an IP cohort of faculty across disciplines to provide training and education on innovative approaches to interprofessional education (IPE).

Health science programs and faculty across the University are committed to IPE in part because it is a stated requirement for national accreditation but more importantly because collaboration amongst members of the health care team is believed to be integral to quality patient care. The Health Care Industry is seeking answers to many questions related to improving patient outcomes and health care

delivery. WSU is well positioned to lead the way in this area of research. The new IP Healthcare Clinic scheduled to open on the WSU Spokane campus during 2016 will provide tremendous opportunities for IP patient care and research.

Multiple funding opportunities are available surrounding interprofessional health care collaboration including four national foundations...the Josiah Macy Jr. Foundation, Robert Wood Johnson Foundation, John A. Hartford Foundation and Gordon and Betty Moore Foundation. With the expansion of health care education across multiple WSU campuses and the plans for a WSU Medical School, a research focus on Interprofessional Health Sciences Education would allow WSU to lead the way in this important area – impacting patients and communities in our region and state.

Thank you for providing this opportunity to submit ideas.

Brenda S. Bray,  
Clinical Associate Professor  
College of Pharmacy

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#### 100) I. Summary

The proposed Water Resources Innovation Center (the Center) at Washington State University (WSU) is specifically designed to allow Washington State, the US and the World to achieve evidence-based and data-driven development objectives. The Center builds on over 50 years of research, outreach and international development experience at WSU related to water as a cross-cutting theme in health, agriculture and economic development. The Center will create evidence-based approaches to transform WSU's abilities to address development challenges domestically and around the world. Establishment of a University Corps for International Development (the Corps) is a cornerstone of the Center. The Corps will enlist university students and faculty in challenges that leverage research and innovation to test and scale new models and approaches for maximizing development resources from sponsors. The trans-disciplinary Center will initially span colleges and departments at Washington State University, our regional and international partners. The Corps will focus on overcoming existing barriers in research and development placing both students and faculty initially here and abroad but with the intent to react to associated with strategic US initiatives.

The Center's goals coincide with the US's need for development data and analysis, new models for development and for support in science and technology, and highly interdisciplinary approaches that connect expertise in areas of engineering, agriculture, health, business and socio-cultural dynamics as well as economics. The Center will consist of integrated multidisciplinary teams that will (1) assesses development problems identifying cultural, political, and resource constraints (2) identify potential solutions that are evidence based, and (3) offer solutions to grand challenges facing the US's development efforts through an innovative entrepreneurship program.

#### II. Improving International Development Efforts

The proposal will address economic, social, health and environmental sustainability issues of global water by addressing the core development objectives. This Center will focus on innovations in

technology and policy that promote sustainable and safe water, supplies to improve health, food security, climate change response, and to reduce sociopolitical conflict in the developing world. The Center will establish a network of leading experts who will help the US solve global development problems. These experts will include interdisciplinary partnerships across the WSU campus, non-governmental organizations, social entrepreneurs and other institutes of higher education. WSU already has an established reputation for leading consortia in global and domestic water challenges through increasing access to water supply and better sanitation practices, improving water resource management among competing needs, and improving water productivity in agriculture. The Center will provide access to critical expertise and capacity for data synthesis, analysis and modeling. On another level, the Center will transfer findings from such analysis into the development of innovative technologies and interventions. Through the Corps, on the ground research and outreach will test and measure the impact of existing and newly-introduced technical and policy approaches. The Corps will combine faculty, staff and students, from WSU and our partner institutions, to evaluate the impact of past and current the US programs and strengthen key systems to reflect the need for a planet-based approach to our water resources. This approach will allow the Center to identify and evaluate interventions, approaches, and policy with the goal of identifying and validating solutions that are scalable and transferable across the globe.

### III. The US Integration

The Center will focus on the Presidential Policy Directive on Global Development through the Feed the Future, Global Health and Global Climate Change initiatives. The Water for Poor Act makes access to safe water and sanitation for developing countries a specific policy objective of the U.S. foreign assistance. As with the Water, Sanitation and Hygiene (WASH) programs we anticipate an emphasis in: behavior change; sanitation and market development; and bringing sustainable services and the institutional structures to sustain them to un-served populations. We will integrate the Center in the US-Washington and countries by developing the Corps, through which US and international sponsors will be able to access a team of water experts that can contribute both time and resources, including graduate students, to the tasks of policy development, programs and partnerships.

### IV. Partnerships

WSU has been working on critical issues in water management in Washington State, regionally on the Columbia Basin and throughout the world including long term relations in the Middle East for more than 35 years in Jordan with the University of Jordan, Hashemite University, and Jordan University of Science and Technology have focused on water development on a regional basis. In addition, WSU has maintained a physical presence for the last 25 years in SE Africa with a local NG, Total LandCare, created initially by WSU, and now registered in Malawi, Mozambique, Tanzania and Zambia. BUILD HERE OUR WASHINGTON STATE AND U.S. CAPABILITIES.

These partnerships have not only been long standing but demonstrate the success in partnering on projects that have long-term development impacts while creating new economic opportunities. The WSU Partnerships were highlighted in USAID's 2011 Final Report "Best Practices for USAID's International Higher Education Institutional Partnerships".

## V. Novelty

Our work at meeting the challenges of human well-being through water has demonstrated the need to create equal partnerships between governmental authorities, non-governmental agencies and businesses that identify common interests and create win-win-win situations for all partners and require equitable investments by all partners. Engaging students in the Corps will not only allow access to some of our brightest and best students and researchers, but will allow the WSU teams to work with NGOs, foreign universities, ministries and the people in developing countries to develop a career in international development.

With the Corps, the Center intends to develop the next generation of Collaborative Modeling (CM). CM utilizes modeling tools to directly involve stakeholders in the modeling process. In CM, the stakeholders are active individuals and can immediately observe the consequences of their actions. CM creates a strong integration of the research and educational elements of a project because 1) research into model development is strengthened because the model is developed to be relevant for specific decision processes, and 2) the educational component is strengthened because stakeholders are knowledgeable of the model and, having played a role in model development, are more likely to base decisions on the model output.

## VI. Technical Approach and Program Description

This approach not only uses traditional assistance pathways but also strives to be innovative in maximizing effective partnerships that have proven successful results for more than 30 years.

Result 1: The Center will effectively deliver scientific and technological breakthroughs

Objective 1.1 - Establish collaborative action programs, which develop stronger WSU faculty and student engagement to find solutions and adapt new and available technologies.

Associated Activities:

- 1) Determine high priority problems that have the potential for short term results; 2) Develop the multidisciplinary teams to address these high priority problems; 3) Utilize the working groups with full participation from the US sponsors

Objective 1.2 – Establish the University Development Corps to focus on the application of science to better understand current and historical challenges, failures, and successes in water management.

Associated Activities

- 1) Obtain information and develop policy alternatives; 2) Provide alternatives related to water and its management and use by policymakers; 3) Inform policymakers about appropriate strategic planning, agriculture, reuse, environmental and health policies related to water

Result 2: Increase Food productivity and adapt food systems to climate change in target regions

Objective 2.1 – Optimize water resource for cropping systems

Associated Activities:



- 1) Implement integrated hydrologic/water resource management/economic modeling framework over focus watershed; 2) Apply the model for a number of future climate, policy, and economic scenarios to explore optimum cropping patterns and optimum use of water

Objective 2.2 – Optimize agricultural management activities for reducing greenhouse gas (GHG) emissions

Associated Activities:

- 1) Starting with the integrated modeling framework described in Result 2, implement a regional-scale Earth system model over focus region; 2) Apply the model for a number of future climate, policy, and economic scenarios to explore strategies to reduce GHG emissions

Result 3: Assist in meeting water supply needs for both the rural and urban poor

Objective 3.1 – Train WSU faculty and staff to improve the Center’s mission capability to identify and assess problems

Associated Activities:

- 1) Identify priority training needs of the WSU, US and the world; 2) Conduct training workshops on selected subjects - improving the interpretation of case studies

Result 4: Assess and develop new technologies for hygiene and sanitation needs and improving human health

Objective 4.1 Develop new programs and initiatives for appropriate and practical new technologies

Associated Activities

- 1) Integrate technological development into agriculture, health, engineering and business curriculum at WSU; 2) Manage Challenge Grants to further develop innovation; 3) Conduct ground-truthing activities that ensure adoption and revision based on user experience

Result 5: The Center will scale and disseminate results

Objective 5.1: Develop our foundation for promoting the Center by establishing the partnership of the Water Resources Innovation Center

Associated Activities:

- 1) Establish a partnership coordinating council; 2) Establish multidisciplinary program working groups to assess status, needs and approaches for addressing global water issues: a) Water resource planning, allocation, management and use; b) Environmental protection and pollution remediation; c) Water economics and policy; d) Education and training; e) Water planning and use in public health; 3) Establish interactions between international partners to share information and experiences; 4) Utilize social media and communications in working groups for planning, faculty and student involvement. The Center will innovate advances in ICTs to build a network of collaborating partners that test the limits of networking to meet the demands of water development for the next generation of scientists, leaders and citizens, 5) Develop capabilities for THE US for information and technology transfer; 6) Expand open resource

materials concerning water especially the relationship between water use and quality and how this relates to human and environmental health.

#### VII. Funding and Leveraged Resources

#### VIII. Building on Current and Past Performance

Washington State University has been working on the critical issues of water across the spectrum of challenges, from human powered irrigation pumps in sub-Saharan Africa to climate change models for the hydrologic cycle. Our efforts include the impact of water on animal and human health as well as public engagement in environmental issues. WSU's water team includes faculty from across campus in the colleges of Agriculture, Engineering, Science, Liberal Arts, Veterinary Medicine and Nursing. We believe that a major challenge to sustainable development of the worlds' critical water resources is closing the gap between sophisticated modeling efforts and creating behavioral changes at the individual and community levels. Advanced modelers need collaborators on the ground working with the real life challenges faced by the adopters of innovative changes.

The success of sustainable development approaches depends critically on the integration of impact assessment into the original design and implementation strategies. The Center network includes several experts who are highly experienced in integrated design approaches and established collaborative interactions and impact assessment. These experts include those focusing on the development of new technologies and approaches and those focusing more on the secondary social, health, and climate impacts of implementation. To assess the health and climate impacts, our network includes members with significant expertise in projecting the emissions and exposure impacts of proposed development strategies using state-of-the-art models for both the water and air environments. We have a diverse team of social scientists to pursue the socioeconomic components of these goals. Our team also has the expertise to physically measure these pollutant exposures and greenhouse gas emissions. By having all of these capabilities within the Center network, our team will be able to explicitly link impact assessment priorities to the broader development goals throughout the design and implementation process.

#### Personnel and Organizational Capability

Highlighted are the Key or Lead WSU Personnel

- College of Agriculture, Human and Natural Resource Sciences
  - International Research and Agricultural Development
    - Chris Pannkuk – (Director of International Agricultural Research); Monitor and alleviate water use and soil degradation, soil and water conservation practices
    - Tom Byers – (Associate Director of International Agricultural Research); Agricultural economics & socioeconomics
    - Colleen Taugher – (Associate Director of International Agricultural Research); Project monitoring and evaluation; Information Communication Technology for Development initiatives;

- Mike Whiteman – (Chief of Party, Malawi Kulera Project); Forestry, wildlife, and range science
- School of Economic Sciences
  - Alan Love – (Director & Professor, School of Economic Sciences); Industrial organization, information economics, supply-chains, and applied econometrics
  - Mike Brady – (Assistant Research Professor, School of Economic Sciences); Agriculture and natural resource economics, coupled economic and biophysical models; land use and land markets, behavioral economics
  - Jon Yoder – (Associate Professor in Economic Sciences); Economic risks of wildfire mitigation, economic tradeoffs and institutional barriers inherent in taking a balanced approach to forest management and wildfire risk mitigation
  - Tom Marsh – (Professor, School of Economics Sciences); Consumer demand and modeling commodity markets; quantitative methods, natural resource economics
- Crops and Soils Sciences
  - Chad Kruger – (Director, Center for Sustainable Agriculture & Natural Resources); Organic cropping systems, biologically intensive agriculture, climate friendly farming and small farms
  - Bill Pan – (Professor, Crops & Soil Sciences); Soil plant relationships in mineral nutrition, nitrogen cycling by sustainable cropping systems, crop root growth and development, and computer imaging of plant roots
- Biological Systems Engineering
  - Claudio Stockle – (Chair, Biological Systems Engineering); Land, air, water resources, and environmental engineering
- College of Engineering
  - Department of Civil and Environmental Engineering
    - Tim VanReken (CEE, Lab for Atmospheric Research): Impact Assessment for air quality and climate change; Data Analysis for environmental factors; Integrated Intervention Design and Implementation.
    - Brian Lamb (CEE, Lab for Atmospheric Research): Impact Assessment for air quality and climate change; Modeling and Data Analysis for environmental factors; Integrated Intervention Design and Implementation
    - Mike Wolcott – (Professor, Civil & Environmental Engineering); Natural fiber composites and biopolymers
    - Jennifer Adam – (Assistant Professor, Civil & Environmental Engineering); Climate change, land use and land cover change, hydrological modeling
  - Department of Chemical Engineering
    - Bernie VanWie – (Professor, Chemical Engineering); Bioprocessing and biomedical engineering with applications in biosensors and miniaturized diagnostic capabilities including designs at the micro and nanoscale, cell culture, and biomass processing

- Jim Petersen – (Director & Professor of Chemical Engineering); Bioremediation of contaminated aqueous systems, modeling of biological processing operations and on-line optimization of biological processes
  - Institute for Sustainable Design (IDEX)
  - Laboratory for Atmospheric Research
  - State of Washington Water Research Center
- College of Veterinary Medicine
  - Paul G. Allen School for Global Animal Health
    - Guy Palmer – (Veterinary Pathologist, College of Veterinary Medicine); Control of animal diseases with direct impact on human health and well-being
    - Terry McElwain – (Professor and Director of Washington Animal Disease Diagnostic Laboratory); Pathogenesis and mechanisms of persistence of vector-borne pathogens, with a long term goal of developing vaccines against tick-borne diseases
- College of Liberal Arts
  - Division of Governmental Studies and Services
    - Mike Gaffney – (Assoc. Director, Division of Governmental Studies); Emergency response, social capital, volunteerism, crime prevention, disaster preparedness, research methodology, ethics, biased policing and profiling, democratization, alternative dispute resolution, community oriented policing, hazard mitigation planning, and citizen-government interaction.
  - Creative Media and Digital Culture, Vancouver Campus
    - Dene Grigar – (Director & Assoc. Professor, Creative Media & Digital Culture); Electronic literature, emergent technology and cognition, and ephemera
- College of Nursing
  - Carol Allen – (Clinical Assoc. Professor, College of Nursing); Community health, care of homeless, low income, chronically mentally ill people
- College of Communications
  - Todd Norton – (Assistant Professor, College of Communication); Risk communication and stakeholder dynamics as these relate to environmental contexts, crisis communication as they relate to emergency management

## 101) Washington State University's Global Development Vision

### International Programs – Research and Development

#### A path to knowledge

We are convinced that innovations, markets and entrepreneurial ingenuity for global poverty reduction are available; it only requires that knowledge be put in grasp of the people in need. Within Washington State University's International Development programs we envision people making decisions to improve the health of their communities and environment. We work on the assumption that everyone wants to

improve their situation and desire to control those decisions that lead to economic stability, healthy lifestyles and a prosperous future.

We work where we are needed and have programs strategically placed around the globe to address regional issues. We began in 1954 and over the years have managed development programs to developing countries valued nearly \$200 million. Today our focus is on interventions targeting small-scale farmers where we currently working in 12 countries, over 7,000 villages and affecting nearly 800,000 individuals. Our focus is on:

- Providing access to clean water and healthy foods with an emphasis on hygiene
- Providing diversification of food crops with low input sustainable systems for production
- Developing enterprises with value added processing and marketing
- Managing natural resources for sustainable supplies

#### About us

We at International Programs for Research and Development at WSU are dedicated to increasing the income levels of people in developing countries through improved researched technologies with sustainable management of their resource base. A key thrust of our International Development program is to provide information to decision-makers to improve policies that support economic development and growth in a sustainable manner. WSU has established high standards of collaboration with government, non-governmental and private sector organizations.

#### Our WSU mission:

1. Enrich the experience of students and faculty by increasing opportunities to participate in education, research, and outreach abroad;
2. Forge mutually beneficial alliances and partnerships in competitively securing grants and contracts to facilitate and support participation in these activities; and
3. Raise the profile of WSU as a quality, internationally recognized institution for its contributions to global development needs.

#### Goals

1. Strengthen the competencies and capabilities of IP/R&D in pursuing opportunities for grants and contracts that:
  - a. Build on existing successful programs around the world
  - b. Focus on disciplines that best reflect WSU experiences and expertise, i.e., agriculture, biological systems engineering, civil and environmental engineering, business and enterprise development, natural resource science and sociology
  - c. Provide exciting and stimulating opportunities for student and faculty participation
  - d. Incorporate an Information Communication Technologies needs and use strategy in research and development oriented proposals and activities
2. Form new alliances and partnerships with both private and public sector organizations and institutions to competitively secure international grants and contracts.
3. Demonstrate IP/R&D financial, academic, student impact and other benefits to WSU by:

- a. Securing an additional public and private contracts and grants annually
- b. Sponsoring student and faculty led seminars to communicate the benefits of research and outreach experiences abroad
- c. Documenting successful research and development impacts by:
  - i. Contributions to science, technology, research and outreach literature
  - ii. Improvement in livelihoods of targeted beneficiaries and their environment

Our development mission is to improve the health and livelihoods of people around the world through knowledge based interventions. Our strategy incorporates three driving forces for sustainability and impact:

1. Community Participation and Empowerment
2. Adaptable, Demand-Driven Interventions
3. Market Sustainability and Replication

#### Our model

Our programs in South East Africa, based in Malawi but extending into Zambia, Mozambique and Tanzania, use participatory approaches with tried and tested interventions adapted to the local climate, politics, and culture to address priority needs and interests. Partnering with local institutions we extend knowledge to local extension services, promoting the adoption of appropriate technologies that are affordable and in high demand. Sustainability is achieved when interventions have proved to be profitable and environmentally friendly with no further need for external support. Low cost interventions are readily adopted because of easy entry into the enterprises. Instead of giving free “hand outs”, loans and revolving funds are set up with newly established clubs or associations. The model is also used in Burkina Faso, Afghanistan, Philippines and Kazakhstan.

#### Our intent

Our intention is to develop Centers of Excellence for International Development using our successful model. These centers are strategically placed where we are currently using the model and will also easily expand into regional programs.

1. Malawi - South East Africa
2. Burkina Faso - West Africa
3. Rwanda - East Africa
4. Philippines - South East Asia
5. Kazakhstan - Central Asia
6. Jordan - Middle East
7. Ecuador - Latin America

#### Centers for International Development

There is no doubt that the health of farmers and their communities are tied to the health of the environment they live. Food insecurity and environmental degradation has reached alarming proportions in developing countries around the globe. The situation is characterized by frequent food shortages either man made or caused by natural disasters. This is reflected in high prices causing hunger

and starvation which affects millions people every year. Land holdings are shrinking in size and becoming more fragmented. Traditional practices that preserved the biodiversity of natural resources are dying out and marginal areas have been brought under cultivation. Continuous cropping is now the norm, often in monocultures with little or no fallowing and few inputs. The rising demand for agricultural land has caused serious water pollution and deforestation. Adapting to these conditions is fundamental to the well-being of the farmers responsible for not only their health but the health of their environment. Several success stories show how research and extension programs have improved on-farm yields and output for small-scale farmers, a group that represents 85 percent of the world's farming community. Community-led efforts have conserved soil, water, forests, and biodiversity for use by current and future generations. And market-based interventions have strengthened the ability of small-scale farmers and food-insecure consumers to gain access to production inputs, rural services, and agricultural commodities.

### The Challenge

Today, farmers across the globe face many inter-related constraints. Among the more common include:

1. overdependence on staple crops which are a moisture-sensitive, nutrient-demanding, high-risk
2. degradation of natural resources and declining soil fertility
3. poor access to improved seeds, chemical and organic fertilizers
4. limited access to credit and capital
5. acute shortages of energy and safe water
6. inadequate knowledge and skills to adopt low cost management and productivity-enhancing technologies
7. inadequate extension services
8. weak market information and integration.

Collectively, these problems have led to a vicious cycle of increasing poverty that is eroding the productive capacity of agriculture and the natural resource base. Eliminating these growing threats requires a long term commitment of resources under a strategy that tackles the root causes of the problems in a holistic manner.

### Our Solution

Our intention is to develop Centers of Excellence for International Development using our successful model. These centers are strategically placed where we are currently using the model and will also easily expand it into regional programs.

### Keys for Planning and Implementing Programs:

- Build on knowledge and understanding of local systems and cultures
- Target communities based on need, commitment and potential
- Ensure community ownership and empowerment through participation and education
- Identify low-cost, demand-driven interventions adapted to local needs and interests
- Create synergies for increased impact by addressing multiple challenges and opportunities
- Promote transition from aid-dependent survival to market based self-sufficiency

- Institute commercial systems of service delivery with capacity to increase and sustain impacts through collaboration and investment from all stakeholders - donors, government, NGOs, the private sector and communities.

The centers will be strategically located geographically as well as where WSU has successful agricultural programs: Malawi, Southern Africa, (subtropics); Burkina Faso, West Africa, (tropics); Jordan, Mid East, (arid); Kazakhstan, Central Asia, (temperate); Ecuador, Latin America and; the Philippines, Southeast Asia (island tropics). Each center will offer extension education, leadership training, technology development to local and regional government and non-governmental organizations as well as private national and international corporations. Divisions of the Centers will consist of:

Inventions and Innovations Division – Appropriate technologies workshop designed to address innovations from the field as well as new cutting edge science. Appropriate Technologies – Collaboration with Participating Communities Global Linkage Project – Using IT to Connect People to Address Mutual Problems, Expert Systems Center - Development and Distribution. Interventions to improve human health supported by WSU’s Global Development programs have positive impacts on rural livelihoods by improving health, by ensuring food security, nutrition, and incomes in balance with their environment. Measures to address these concerns are both ameliorative and sustainable:

- Increased food security, nutrition, and incomes:
  - Crop diversification – cereals, grain legumes, roots & tubers, spices & vegetables
  - Low cost irrigation systems – stream diversion, treadle pumps, water harvesting
  - Conservation measures – reduced tillage, agroforestry, organic manures, and legume rotations to improve soils and crop yields at low cost
- Environmental Stewardship:
  - Planting trees to meet household needs for building material and fuel
  - Managing natural resources for sustainable supplies of natural products – e.g., fuel, forage, wildlife, fisheries, fruits, mushrooms, medicines, building material
  - Introducing alternative energy technologies to save wood and labor
- Enterprise Development with value-added processing and marketing of agricultural and natural resource products like:
  - Simple low-cost processing and drying of cereals, fruits and vegetables
  - Bee keeping
  - Cattle rearing
  - Fish farming
  - Mushroom production
- Water, Health and Nutrition:
  - Creating awareness about basic health, nutrition and hygiene
  - Providing access to clean water from covered wells equipped with hand-pumps
  - Diversifying crop production to promote balanced diets
  - Introducing low-cost eco-friendly pit latrines



Technology Menu Development Division – In charge of identifying and preparing rollout of technologies, demanded by the community, which may or may not have hidden linkages reducing resource demand which, in turn, will result in better acceptance rates,

Community and Household Integration Division – Provide the interface with the Invention and Innovation Division to assure that technologies being developed are appropriate for the Landscape System.

Financial and Economic Needs Assessment Division – Provide both economic and financial guidance on the requirements for “last mile” delivery of macro and micro financing to support program and project output and outcome delivery.

Training Division – Leadership training for those who work in or are preparing to work in the international development profession. It would also undertake all training functions for host staff as well as International Guest Speakers. (Curriculum developed around the needs of grantees from donor projects Transformation Partnership Program -- Network of Cooperating Communities/Countries)

Application, Monitoring and Evaluation Division – This Division would develop and introduce both sectoral level M&E systems and also promote Community Based Monitoring and Evaluation tools designed to seamlessly integrate with the sectoral level evaluation tools. Primary emphasis would be placed on both techniques; e.g. CBM&E is equally important for delivery and policy analysis. The AMED will develop tools and techniques to assess impact and measure physical, monetary and social outputs and “downstream” outcomes from “Institute” related initiatives. It would house an Adaptive Research Section (ARS) that could, independently, modify and test “best bet” technologies that had been generated by the Centers and was being rejected at the community level.

#### Expected Regional Center Benefits

In the long-term, the centers will have positive impacts on the health of the people by increasing nutrition and access to health care, the livelihoods of the villages by increasing opportunities to earn income all while reducing environmental degradation. Measures planned to address these concerns are both ameliorative and sustainable. Expected benefits include:

- Villages will be empowered to address their own problems and needs; to harness their own resources and capabilities; and to formulate bye-laws to better regulate, use and manage natural resources.
- Participating villages and households will improve their skills in sustainably managing their farm and natural resources, thereby benefiting them individually and the region economically. Prospects will be available to diversify activities. Direct benefits include increased food security, income generation and better access to natural resources.
- The environment will benefit from reduced air, soil and water degradation through a) increased tree planting, b) increased protection and management of natural forests, c) protection of vulnerable stream bank areas and watersheds, d) increased efficiency of fuel use; and e) increased use of alternative materials for fuel.

- Buy-in from other stakeholders will be mobilized within and outside the region to attract support for expanding and strengthening the program.
- The program's integrated community-driven approach in natural resource management will provide lessons and experiences to build a successful model for replication, expansion, and adaptation to other areas in the region as well as to neighboring countries.
- Development of case studies illustrating successes and benefits of the program.
- Spin-off programs will arise that address issues of mutual interest to all partners (e.g., introduction of irrigation and other technologies to increase food security and income; development of improved natural resource curricula for primary and secondary education; reducing the use of child labor in rural areas; cross-over programs that address the inter-related elements of nutrition and health, especially HIV-AIDS).
- Opportunities will emerge to improve technologies and practices through research and development involving a range of institutions.

The result will be regional centers with unique, flexible and successful approach to agricultural development globally. Their foundation and uniqueness will be a ground up approach, rather than a top down one, with an emphasis on understanding the farming, human health and production systems. They will also focus on knowledge and science and their application in a variety of needs, circumstances and settings. A major component will be training and leadership incorporating all the above. Its training programs will assist in establishing a new cadre of knowledgeable and effective development professionals that can positively impact the implementation of development programs. They will be unencumbered by the array of regulations and bureaucracy that hinder other development organizations. Thus, they will be flexible and responsive to changing circumstances and opportunities. The centers will establish relationships including partnership, networks and others to access a wealth of development knowledge and experiences relevant to its purpose. Because of their resources, theoretical and actual, it can influence others in improving the delivery of agricultural development everywhere. All of these incorporated into the centers will make it unique and meet needs not currently being met in the broad development environment.

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102) The energy technology in the Pacific Northwest is one of the fast growing industries. Examples are SEL in power grid protection, Alstom Grid in computer software and communication systems for power grids, and ITRON in smart meters for smart grid, all in the State of Washington. In addition, PNNL has a leading R&D program in power systems. On the industry side, Bonneville Power Administration, Avista, and Snohomish Public Utilities are industry leaders in developing and deploying smart grid and renewable energy technologies. More recently, the futuristic solar energy and energy storage technology companies have been established in the State of Washington. The State dedicated \$40M for Clean Energy Fund in this funding cycle. It is likely to grow in the future. These sectors of the energy technologies as a whole represent important opportunities in creating jobs for WA and the Pacific Northwest.

Through WSU Energy Systems Innovation (ESI) Center and long term effort of the faculty, strong collaborations have been established with all key members of the energy technology sectors. The

benefits for WSU research and education have been highly significant. The opportunities also extend from all areas of engineering and architecture to other colleges at WSU that provide expertise in related areas such as energy sciences, economics, sociology, human factors, environment, and public policies. These existing and expanding multi-disciplinary teams will position WSU to be a world class leader in developing major programs with US government agencies, State of Washington, energy industry sectors, and other stakeholders. It is also a board based, inclusive theme of opportunities for WSU's national and international leadership in the energy area.

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103) I would like to propose Interprofessional Health Sciences Education as a theme for innovative research at Washington State University. Currently there is an interprofessional (IP) team of faculty researchers at WSU Spokane working on a 3 year \$1.1 million awarded from the Health Resources and Services Administration (HRSA). Grant participants include faculty from nursing, pharmacy, medicine, nutrition/dietetics and social work (Eastern WA University). The grant entitled Using Interprofessional Education to Improve Care for Patients with Multiple Chronic Conditions was awarded with the aim of assembling an IP cohort of faculty across disciplines to provide training and education on innovative approaches to interprofessional education (IPE).

Health science programs and faculty across the University are committed to IPE in part because it is a stated requirement for national accreditation but more importantly because collaboration amongst members of the health care team is believed to be integral to quality patient care. The Health Care Industry is seeking answers to many questions related to improving patient outcomes and health care delivery. WSU is well positioned to lead the way in this area of research. The new IP Healthcare Clinic scheduled to open on the WSU Spokane campus during 2016 will provide tremendous opportunities for IP patient care and research.

Multiple funding opportunities are available surrounding interprofessional health care collaboration including four national foundations...the Josiah Macy Jr. Foundation, Robert Wood Johnson Foundation, John A. Hartford Foundation and Gordon and Betty Moore Foundation. With the expansion of health care education across multiple WSU campuses and the plans for a WSU Medical School, a research focus on Interprofessional Health Sciences Education would allow WSU to lead the way in this important area –impacting patients and communities in our region and state.

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104) Technology usage in the Virtual World of Engineering and Construction

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105) Research Area - Initiative on Reducing Post-harvest Losses

Submitted by Amit Dhingra

Every year, 1.3 billion tons of produce are wasted (CGIAR 2013). That translates to approximately one third of the food that is produced annually for human consumption. A large part of this waste can be attributed to losses incurred in the post-harvest stage of the plant.

WSU has invested in enhancing its capacity to monitor plant growth and development with the phenomics facility. However, to meet the needs of a burgeoning population, production of food alone will not suffice.

We propose an establish an initiative to reduce post-harvest losses with a phenomics initiative targeted to monitoring and engineering of improved infrastructure and approaches to extend the life of post-harvest product.

This initiative will involve researchers from Horticulture, Food Science, BSE, EECS, Research and Extension Centers, Extension faculty, AgEcon and Engineering.

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106) Research theme: Plant resource acquisition and allocation to secure future food production and quality

The grand challenge in plant sciences is to understand and enhance resource acquisition and allocation in order to optimize sustainable plant production in changing environments. Plant physiologists in the School of Biological Sciences have continually received significant federal funding to perform research tackling these issues.

We propose to integrate the expertise of the SBS faculty with knowledge in other disciplines across the WSU campus in order to understand and improve plant growth, seed yield and nutritional quality in varying environmental conditions. The SBS plant physiologists together with engineers, ecologists, biochemists, cell biologists, molecular biologists, geneticists and mathematicians will need to answer pressing questions on nutrient acquisition and partitioning, water and nutrient use efficiency, and effects on metabolism in source (e.g. leaf) and sinks (e.g. seeds). We will accomplish our goals through knowledge-based molecular, cell biological, metabolic, and environment manipulations.

Mechthild Tegeder, Asaph Cousins, and Michael Knoblauch

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107) Research Theme: 'Foods for Health'

CAHNRS and WSU have significant resources, capacities and activities in the "Foods for Health" research area. However, these capabilities and activities are scattered within different departments and units. The proposed research theme is centered to major activities of CAHNRS, however several units of other colleges can be major contributors to this research theme. For example, units in Medical Sciences, Veterinary Medicine, Nursing, Pharmacy, Arts and Sciences, Engineering and Architecture, and Communication also conduct research contributing to this theme.

WSU is in a unique position to carry out this research theme as the State of Washington has a large number of agricultural commodity groups, food processing and industry and fairly large consumer base. The proposed research theme is close to the heart of general population.

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108) Sustainable Agriculture/Genetic Resources/Food Security

There are many ideas submitted to your subcommittee that contribute to the idea of food security, sustainability and sustaining human health. Given the noted losses of pollinators and concerns for sustainable agricultural practices, I would like to emphasize that sustainable agriculture and human health are intrinsically linked together.

One major emerging strength at WSU derives from the recent establishment of the world's first (and currently only) honey bee germplasm repository at our University. The honey bee is the single most important agricultural pollinator and the development of honey bee semen cryopreservation at WSU now makes possible a fundamental change in honey bee breeding, not unlike what has happened with other agricultural animals over recent decades. The Honey Bee Germplasm Repository will serve to maintain honey bee genetic resources identified and imported from areas of endemism in Europe, Africa and Asia and also be a focal point for conservation of "top-tier" US honey bee stocks. There is, for the first time, the possibility for queen producers to breed "across space and time" to support pollination of a vibrant sustainable agricultural system.

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## 109) Foods for Health

Adapted from CAHNRS's Report on Center for Foods for Health

### Justification

Maintaining good health across the entire population and rising societal costs associated with poor health are among the nation's most difficult and challenging problems. There is a close association between foods eaten and health. Healthy foods provide necessary nutrients and bioactive compounds for optimal health, while foods of poor quality lead to obesity, diabetes and other associated metabolic diseases. Thus, healthy foods are indispensable to sustaining good health for the individual and the general population.

Washington State is a major state for agricultural production, and is the home of major food processors. Washington State University, as the leading state institution for agriculture and food research, is in a unique position to promote the production, processing, and consumption of healthy foods. To this end, "Foods for Health" has been identified by CAHNRS administrators and faculty as an emerging area of excellence.

### Vision

"Foods for Health" excellence area includes the following four core components (Fig. 1):

1. Production: Production of foods of both plant and animal origins with high health-promoting properties.
2. Nutrition and bioactive compounds: Biological effects of food bioactive compounds and optimization of nutrient composition in foods.
3. Food processing, safety and quality: Adding values, providing convenience, and improving microbiological and chemical safety of foods, reducing environmental foot prints of processing industry.
4. Consumer behaviors/education: Consumer-centered research and extension activities.

## Potential Participating Units

The following research programs can potentially participate in the activities related to above grand theme. Researchers and clinical scientists of the proposed WSU medical school will be able to develop research programs evolving from this theme to differentiate themselves from UW medical school.

### College/Campus Theme / Goal

#### Carson College of Business

1. Behavioral Business Research

#### CAHNRS Agriculture

1. Foods for Health
  - a. Basic plant sciences: Genomics Metabolomics, and Genetics
  - b. Crop production systems and plant breeding
  - c. Food processing systems
  - d. Biologically intensive (sustainable) and organic agriculture

#### Human Sciences

1. Individual and Family Development, and Prevention Science
2. Economics: Agricultural, Behavioral, Consumer, Health, International, Marketing, Supply Chain, and Transportation
3. The Columbia Basin and Puget Sound: Laboratories for agricultural and urban sociohydrology and economics.
4. Environmental and Resource Economics

#### College of Arts and Sciences - Targets for Innovation:

- B. Climate change and global food & water security
- C. Sustaining health and wellbeing
- D. Decision making and integrated data sciences
- E. Economic development
4. Chemistry of living systems {C,E}
5. Child development and adjustment {C}
8. Cultural effects on human adaption {A,B,C}
10. Decision making from the individual level to the public policy level {A,BC,D,E}
12. Materials Physics {A. D. E}
16. Nanoscience {A,E}
9. Statistics. modeling, and mathematical analysis {A,B,C.D.E}
20. Sustainability of natural, human. and built environments {B.C.D}

#### College of Education 2. Measurement and evaluation

3. Cultural and linguistic diversity
5. Health and wellness
6. Cultural studies in education

#### College of Medical Sciences

1. Sleep
2. Cancer

## College of Nursing

1. Behavioral Health and Addictions
2. Community and Public Health
3. Educational Innovations and Outcomes
4. Patient Care Safety and Quality

## College of Pharmacy

4. Multidisciplinary Health Outcomes Research/Epidemiology

## College of Veterinary Medicine

2. Global Animal Health Individualized Medicine

## Murrow College of Communication

1. Health promotion, media literacy, applications of new technologies to health promotion and health literacy;
3. Science communication and risk communication;
4. Media psychology and communication processes and effects

## Voiland College of Engineering and Architecture

- 2, Advanced Materials
4. Air/Water

## 110) Ecology and plant and organism response to global change

111) Evolutionary genomics in health and disease of organisms that are of importance to humankind from a disease perspective or because of their relevance for increasing wealth and equity worldwide

## 112) Value-Added Foods for Health and Nutrition

Value-added foods are a huge part of our state and nation's economy. In the recent years there has been an alarming rate in obesity in our state and all over the nation. This will have significant implications on the health care costs and other losses to our economy.

We are at a stage in our state and country where there is big needs to develop foods that are going to help the population live a healthy and balanced life. Washington State is in a great situation. We are one of the leading states in agricultural production. We have already invested a lot into the production aspects. We have also invested over many years in the medical field.

But the key aspect of delivering the agricultural produce to the consumer, Food Processing, has not been given enough attention. While this is the area that can play a major role in the fundamentally eradicating the health issues that we are facing in the state and nation.

Since WSU is already strong in production agriculture, this give us a VERY STRONG and unique opportunity to become the leader in the area of food processing for producing healthy processed foods.

The area of food processing, brings together, many disciplines together. This will include, processing, engineering, chemistry, biochemistry, plant production and other areas.

We already have many strong programs related to value-added food processing at WSU. This presents the opportunity to pool them and develop a synergistic program that is of national and international importance.

I truly believe in this. I really hope the management considers this for the future plans.

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### 113) Renaissance 2.0: How Can Humans Flourish in a 21st Century World?

The Renaissance saw a confluence of science, technology, and art emerge and flourish within powerful currents of change that transformed human agency and prospects for centuries. We approach another such watershed. Society critically needs a new perspective or Renaissance that integrates human values, culture, and experience with rapidly changing scientific and technological advances in the context of grand, global challenges. Now, to flourish as a society, we must develop a Renaissance 2.0 approach as an innovative intellectual transformation in the following areas:

- Food security: to flourish, new advances are needed to create a secure food supply for a global population and one that eliminates malnutrition on a global basis.
  - Human health: to flourish in the face of global population growth and changing climate, technological advances must be integrated with attention to the human condition across the world.
  - Sustainability for earth, ecosystems and society: to flourish in the context of global change, we must develop new paradigms for use of our natural resources rooted in sense of place yet cognizant of interdependencies at larger scales.
  - Energy for the future: to flourish in ways that protect critical ecosystem services, new sources of energy must be developed in economically and environmentally equitable ways.
- 

### 114) The Pacific Northwest: leaders with a sense of place in a changing world

Human societies are experiencing unprecedented change worldwide – technology, culture, environment, economies, social structure – presenting both opportunities and challenges. The Northwest stands out in the U.S. as a region that has the natural resources, economic drivers, energy potential and strong cultural diversity and history to assume even greater global leadership as other regions face more desperate situations in terms of environmental, cultural and economic change. Explicitly recognizing this role, WSU can leverage its strengths in data-intensive, experimental and field-oriented research to provide structure and support for Washington State and the Northwest as it assumes a more prominent global leadership position. Particular WSU strengths include but are not limited to fields as diverse as: environment, agriculture, alternative energy, science and risk communication, global economics, political and social science, regional and Tribal history and art.

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### 115) Building Resilience through Science, Technology and Culture

A resilient community is one that can adapt and thrive within a dynamic environment. In our rapidly changing world, we not only encounter new types of challenges but increasingly see the boundaries



between both current and future, and local and global problems begin to blur. For society to flourish as the world and our understanding of it evolve, we need a more robust integration of scientific knowledge, technological innovation and cultural perspectives that crosses and spans scales. With WSU's strong programs in health, engineering, the humanities, and a broad suite of physical, natural and social sciences, the university has the multiple research lenses needed to identify and bring these complex problems into a new, more comprehensive focus. Each disciplinary component of resilience research is rich in fundamental questions, and the integration across disciplines is likely to be an exciting and creative data-intensive research challenge with actionable results for society.

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116) This document clearly JUSTIFIES why WSU should have a strong presence on Food Science and Technology to properly address current and growing needs to feed the World Population. WSU has an excellent opportunity to establish a clear lead on this subject and it should be a top priority for the University. This is a document released last week by IUFOST, THE World Society on Food Science and Technology.

Global Visions for the Role of Food Science and Technology to meet Societal and Technological Challenges. Read the report at [globalvisions.iufost.org](http://globalvisions.iufost.org)

The key drivers and issues facing food production and security on a global basis are well known. Growth, Security, Sustainability, Diet and Health are global headlines. To achieve any progress, the role of best practice in food manufacture and the distribution of safe, stable foodstuffs requires the contribution of Food Science and Technology (FS&T), with its interdisciplinary skills. An educated and trained workforce also will be crucial. What is NOT known is whether and how regions, nation states, and global food businesses are developing individual strategies to cope. As a result, the future role of Food Science and Technology (FS&T) in societal and technological challenges is unclear, as individual regions and nation states may have different objectives and visions for their future.

With Global Visions for the role of Food Science and Technology to meet Societal and Technological Challenges, Academy Fellows Anne-Marie Hermansson, Chalmers University of Technology, Sweden, and Peter Lillford, University of Birmingham, UK, are mapping the current state of affairs from which collaboration, change of programmes, and best practice in Food Research, Technology and Innovation worldwide can be recommended. The results can be used by stakeholders in strategic discussions of the role of FS&T with ministries and governments.

Global Visions began with partners from different parts of the world being asked a common set of questions relating to the current situation and for their projections of what may be needed in the future. The situation country by country was examined for any regional patterns in the attitudes and strategies for FS&T, followed by a clustered analysis, conclusions and recommendations. So far, the report is based on the contributions that have been received from different parts of the world, but there are still many countries from which we are missing up-to-date information.

The report offers an approach upon which you are encouraged to build in your own countries and regions. The Global Visions website has been developed to provide ongoing input into the vital issues that will shape the future of Food Science and Technology.

This affects all of us. Go to [globalvisions.iufost.org](http://globalvisions.iufost.org) to read the report, contribute to the project and stay up-to-date on its progress.

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**ABOUT IUFOST**The International Union of Food Science and Technology (IUFOST) is the global scientific organization for food science and technology. IUFOST has five regional groupings, ALACCTA representing Central and South America, EFFoST representing Europe, FIFSTA representing the ASEAN countries, MENAFoST representing the Middle East and North Africa region and WAAFoST representing West Africa. IUFOST is a full scientific member of ICSU (International Council for Science) and it represents food science and technology to international organizations such as WHO, FAO, UNDP and others.

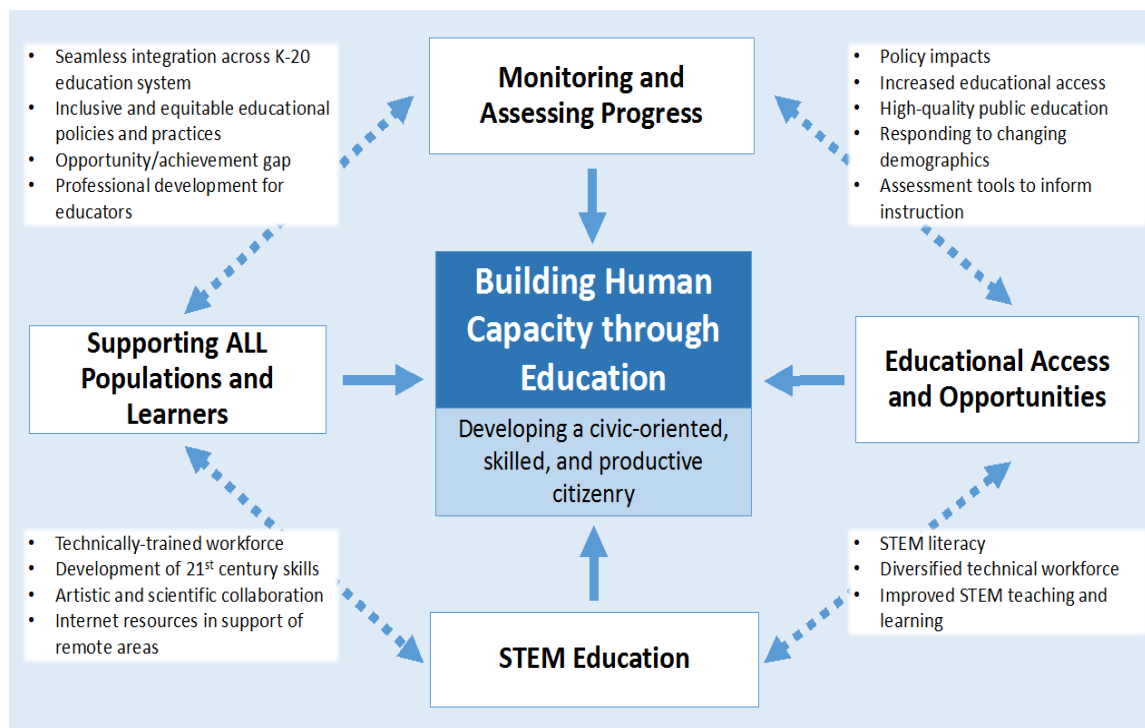
IUFOST organizes world food congresses, among many other activities, to stimulate the ongoing exchange of knowledge in those scientific disciplines and technologies relating to the expansion, improvement, distribution and conservation of the world's food supply.

## WSU RESEARCH THEME WRITE-UP

### Building Human Capacity through Education

Many would argue that there is no greater area of importance in sustaining our country's health and democracy than education. The state of Washington identifies K-12 education as its top priority, and President Obama and nearly all national leaders routinely claim its vital role in society. Building human capacity is one of the **grand challenges** society faces, and education has been a consistent force for change throughout history. Education builds human capacity through its impact on cognitive, affective, and behavioral development by increasing *access and opportunity* for all individuals in society, and by addressing critical *workforce needs* (e.g., STEM education). Educational research addresses each of these components and is especially important in policy formation, transforming thought, developing tools for learning, and informing classroom instruction.

Washington State University has and continues to generate important educational research in a variety of key areas. WSU is home to several education-based research centers. Current external grant funding involving WSU College of Education faculty alone exceeds \$10, 400,000, and many grants in other WSU units also have an educational focus. In the College of Veterinary Medicine, faculty associated with the Teaching Academy pursue educational research associated with the high school to college transition and student success at the university level. As noted below, many research collaborations between faculty across the university—particularly in the STEM area—take advantage of their shared interests and diverse strengths.



WSU is poised to build on existing strengths and address grand challenges in several education-related areas:

**Main Theme**

- Building Human Capacity through Education  
Developing a civic-oriented, skilled, and productive citizenry

**Subthemes**

- STEM (Science, Technology, Engineering, and Mathematics) Education Research and Practice
- Educating Culturally- and Linguistically-diverse Students
- Providing Educational Access and Opportunities for Traditionally Underrepresented Student Populations
- Monitoring and Assessing Progress

***Faculty strength, infrastructure capability, sponsor interest, and importance for maintaining intellectual diversity and creative environment.***

WSU Research centers, laboratories, and teaching academies that focus on maintaining and building human capacity for all individuals through education

- Learning and Performance Research Center (LPRC)  
Provides leadership, training, consultation, and state-of-the-art solutions to challenging educational research questions at the university, state, national, and international levels.
- Center for Environmental Research, Education, and Outreach (CEREO)  
A network of more than 200 faculty, staff, students, and industry leaders working to resolve environmental issues through education, research, and collaborative partnerships.
- Engineering Education Research Center (EERC)  
An interdisciplinary center engaging in engineering education research, teaching and learning, outreach, assessment, and faculty development.
- WSU Spokane Health Science STEM Education Research Center (under review by faculty senate)  
Mission to coordinate and enhance excellence in health science STEM teaching and learning at WSU, the state, and beyond by conducting, supporting, integrating, and disseminating health science STEM education research and related outreach programs and professional activity.
- Educational Neuropsychophysiology Laboratory (ENL)  
Funding recently approved for this College of Education laboratory, which will generate interdisciplinary research and collaborations within WSU and across institutions. Research will lead to greater understanding of cognitive change due to learning and assist in the development of new tools for educational research.
- Northwest Center for Mestizo and Indigenous Research and Engagement  
Research, dissemination, and engagement with Mestizo and indigenous populations in the Pacific Northwest, including focus on educational and health disparities.
- Native American Clearing House  
Provides a variety of services and expertise pertaining to research in Indian education to WSU students and faculty and those interested in learning more about Indian education issues.
- Plateau Center  
Research and scholarship with a focus on the tribes of the Columbia Plateau Region and their unique cultures, histories, achievements, and contributions.
- WSU Vancouver Center for Social and Environmental Justice

- Catalyzes collaborations between WSU faculty, students and community partners to foster rigorous analysis of social, economic, racial and environmental justice issues and promote human rights and conflict resolution at the local, national and global levels.
- College of Veterinary Medicine (CVM) Teaching Academy  
Internal mini-grant program, and collaborative research with College of Education faculty, on teaching and learning in the classroom.

#### Ongoing, funded collaborative research in subtheme areas

##### Examples

- Enhancing understanding of scientific concepts and practices with the science writing heuristic approach, concept mapping, & instructional design. (Institute of Educational Sciences funded)
- Developing principles for mathematics curriculum design and use in the common core era (NSF funded)
- Increased STEM achievement through multi-level learning inquiry teams (NSF funded)  
Making mathematical reasoning explicit (NSF funded)
- Assessing a Just-in-Time Professional Development Approach for Teacher Knowledge Growth in Computer Science (NSF funded)
- Riverpoint advanced mathematics partnership (Higher Education Coordinating Board funded)
- Delta High School research and evaluation plan (Paul Allen Foundation funded)
- Affordable desktop learning modules for engineering instruction to facilitate transformation of undergraduate engineering classes, high school recruitment & retention (NSF funded)
- Building Theories That Inform Practice: Exploring Engineering Epistemologies Through Cross Disciplinary Data Analysis (NSF funded)
- Pacific Northwest Collaborative Opportunities for Success in Mentoring of Students (NSF funded)
- Enhancing Capacity for Special Education Leadership (Department of Education funded)

#### Multi-campus environment and partnerships

- State-wide research, teaching, and service presence in education
- Well-connected research activity across sites, including federally-funded collaborative grants
- Strong connections and research partnerships with K-12 schools and community agencies across the state
- Partnerships with Native American tribes
- Multi-campus, interdisciplinary STEM group coordinated by the College of Arts and Sciences.

#### Graduate level education

- State-wide, multi-campus doctorate in educational leadership
- Ph.D. in areas relevant to subthemes, including mathematics and science education; cultural studies; special education; and literacy, language, and technology.

#### Sponsored Interdisciplinary Conferences at WSU

- Northwest Association of Teacher Educators
- Globalization, Diversity, and Education conference
- TECH-Ed (“Technology and Enhanced Curricula in Higher Education”)

#### Political support at the local and national levels

- High interest amongst national and regional funding agencies

- STEM education, student assessment, and educational access are consistent political themes
- K-12 education is number one priority of state legislature
- High interest from industry in building human capacity through education (e.g., support for Boeing Distinguished Professorships in the College of Education)

***Barriers to success***

1. Limited status given to educational research across the university, although this may be changing
2. Misperceptions and lack of knowledge regarding the strong research and grant productivity of education researchers at WSU.
3. Lack of central database or hub to support research focused on building human capacity through education
4. Much education research, in particular research in the schools, requires large time commitments and establishment of long-term collaborations with colleagues, schools, and community agencies

***Recommendations to improve and sustain environment***

1. Increase faculty numbers in STEM education, Cultural studies, Measurement and evaluation, and Educational technology
2. Facilitate and support faculty collaborations with the schools and across departments and campuses.
3. Foster and support development of the new WSU Spokane Health Science STEM Education Research Center.
4. Form a STEM Education Research Center (beyond a health focus), similar to those currently being formed in several AAU universities.
5. Increase funding for training grants and post-doctoral researchers in the Learning and Performance Research Center.
6. Establish an interdisciplinary Center or Institute for Culturally Responsive and Critical Educational Research.
7. Foster the development and interdisciplinary use of the Educational Neuropsychophysiology Laboratory (ENL)
8. Seek additional resources for research on innovations in assistive technology for educating students with disabilities.
9. Make the recent TECH-Ed conference at WSU an annual event.
10. Continue to hold the annual Globalization, Diversity, and Education conference and the Northwest Associate of Teacher Educators conference at WSU.

## **Subtheme Narratives**

### **STEM (Science, Technology, Engineering, and Mathematics) Education**

The area of STEM education was explicitly stated as a national priority in the 2012 presidential address. Research by WSU faculty on all campuses currently investigates innovative teaching methods, teacher and administrator development, equitable learning opportunities, and teacher and student outcomes in STEM fields across the K-20 educational spectrum. The work is supported by several large NSF- and state-sponsored grants, some of which involve collaborations with faculty in biological sciences, education, engineering, and mathematics. A Boeing Distinguished Professorship is held by one faculty member. A new initiative—the Spokane STEM Health Science Education Research Center – will involve research on pedagogy in the health science fields. The Center for Environment Research, Education, and Outreach (CEREO) involves over 200 faculty involved in various STEM-related and environmental education and research efforts. Research on technology in education was recently presented at a TECH-Ed (“Technology-Enhanced Curricula in Higher Education”) conference co-sponsored by the College of Education, Provost Office, and WSU Teaching Academy, with plans to make this an annual event. A newly-developed Ph.D. in Mathematics and Science Education is a cross-campus collaboration in its second year that currently supports 13 doctoral students. Paul Whitney, Associate Dean in the College of Arts and Sciences, is currently leading a cross-campus, cross-college initiative focused exclusively on STEM education research. The area of STEM education research at WSU is characterized by faculty strength, collaborative opportunities, and strong sponsor interest.

STEM education research will continue to be important over the next decade as the state and nation address new standards for science and math education, a continuing press for new STEM-focused schools, and how to support all students’ success in STEM areas. Research generated at WSU will guide policy decisions, improve the approaches and practices of STEM teacher development, and evaluate and impact STEM student learning outcomes. STEM education constitutes a substantial amount of current federal and foundation funding, and WSU is poised to build on past strengths in the area of grant procurement in this area.

### **Educating Culturally- and Linguistically-diverse Students**

With the growing number of minority-majority populations in the U.S. and the interdependence of language and culture in the global forum, research in this area is critical to the national economy and in the communicative and civic-oriented abilities of our citizenry. Research by WSU faculty on all campuses is addressing culturally responsive pedagogy, bilingual education, English language learners, and multicultural counseling and assessment. Some of the funded STEM education research noted above has addressed diverse populations, and cross-national studies of personality structure, assessment, and prediction have been supported by large NSF and NIH grants. Two new initiatives, the *Northwest Center for Mestizo and Indigenous Research and Engagement* and the *Native American Clearing House*, both housed in the College of Education, will focus on research, dissemination, and engagement with indigenous populations in the Pacific Northwest. Strong partnerships between WSU faculty and local Native American Tribes provide further opportunities in this area. An annual Globalization, Diversity and Education conference at WSU further illustrates the university’s commitment to this research theme. Two PhD programs (Cultural Studies and Language, Literacy, and Technology) are well-established and support large numbers of doctoral students in these areas.

Educational research in the area of cultural and linguistic diversity will continue to grow in importance over the next decade with the increasing diversity of the U.S. population, the globalization of our international societies, and the growing numbers of ethnic and linguistically minority populations in our nation's schools. Educational research at WSU can inform policy and provide usable information on how to specifically support these learners succeed in school as well as support pathways for their success in our society.

### **Providing Educational Access and Opportunities for Traditionally Underrepresented Student Populations**

Gaps in educational access and achievement amongst various student populations in the U.S. have been a persistent problem. For example, less than 50% of Native American students graduate from high school in the twelve states with the highest Native American populations, including a 42.7% rate in Washington. As measured by achievement tests, educational access, and degree attainment, the following five groups all experience current gaps in achievement: racial and ethnic minorities, English language learners, students with disabilities, boys/girls, and students from low-income families.

In 2009, the Washington State Legislature created the Educational Opportunity Gap Oversight and Accountability Committee (EOGOAC). WSU Faculty and graduate students have worked collaboratively with the EOGOAC on the committee's charge to close the gap by attending EOGOAC meetings in Olympia and Seattle. Members of the EOGOAC and Senator John McCoy have visited the Pullman campus on several occasions to meet with WSU faculty to discuss future funding and research to close the gap. The WSU Spokane campus hosted a recent EOGOAC meeting and community forum, the first meeting held in Eastern Washington, as a result of our collaboration.

WSU can impact state and national policy on educational access and standards for learning amongst traditionally underrepresented student populations by continuing to conduct research that informs curricular and instructional decisions that support these learners succeed and contribute to our society.

### **Monitoring and Assessing Progress**

Assessment of educational outcomes and interventions, such as the impact of programs on student performance, involves a unique intersection of psychometrics, cognition, and evaluation. Schools are currently held accountable by the U.S. Department of Education to demonstrate measurable improvement for all students, including those from special populations and underrepresented groups. Therefore, educators and their institutions must have measurement and evaluation training and resources, and be prepared to properly interpret and explain results of standardized test scores or other evaluation indices to a wide variety of audiences.

*The Learning and Performance Research Center (LPRC) at WSU is a hub for applying measurement and evaluation techniques to educational problems and developing new statistical procedures and assessments. The Center supports numerous graduate students and partners with various colleges inside WSU as well as business, community, and educational partners in evaluating educational success and attainment. The research has been supported by numerous grants totaling over \$7 million from diverse agencies including the U.S. Department of Education, NSF, NIH, the Department of Agriculture, and the Paul Allen Foundation. Students in this area have obtained internships at large research and testing organizations (e.g., ETS, ACT, Center of Educational Progress), and faculty have published widely in this area. Under the direction of the LPRC, WSU has developed advanced training opportunities for faculty and students in measurement and evaluation, a yearly LPRC-sponsored methods workshop*



conducted by outside national leaders, and a research methods training certificate program currently under review.

Measurement and evaluation techniques have broader applications that intersect with a variety of key initiatives at WSU involving the analysis of large data sets. Research activities involving data science, big data, neuroscience, and modeling all involve a variety of quantitative evaluative techniques that intersect with the goals and skills of the LRPC. Further, funded scientific- or humanities-driven projects often have a mandatory educational component that requires measurement and evaluation skills to monitor and assess. Measurement and evaluation in the area of education is a field with current faculty strength, opportunities for collaboration, and diversity in application. With additional resources, WSU could become a cross-disciplinary hub for methodological and statistical research and training with a national reputation, while further enhancing its land-grant mission in the examination of educational programs and outcomes in Washington and beyond.

## **WSU RESEARCH THEME WRITE-UP**

### **Energy in a Societal Context**

**Grand Challenge:** The sustainable, secure provision of energy is critical to the functioning of modern society. Not only is energy the backbone of much of what we take for granted (water, traffic, communication, food), but the way in which it is provided and used has implications for global challenges including climate change and social stability. The energy challenge must be met by a multi-faceted approach. Hydropower along with fossil and nuclear power will continue to be part of the energy solution for the foreseeable future and improving these technologies for safer, cleaner, more efficient power production is essential. Development and production of sustainable, bio-based fuels, and alternative renewable energy sources such as those derived from wind and solar power, and hydrogen-based fuel cells along with new storage technologies are all important elements of the solution. Design of buildings and infrastructure for more efficient energy use and optimized industrial processes for energy efficiency will help to reduce the energy demand that has skyrocketed and will continue to increase over the coming decades. Smart grid technologies with the capability of bi-directional communication are opening vast new possibilities for improving both efficiency and sustainability of energy systems. Knowledge about how to successfully bring these new technologies and infrastructures into use is in its infancy and the issues are complex. Successful adoption will involve better understanding of interactions among consumers, service providers, utilities, and governments. Fully realizing opportunities will require improved understanding through continuing research integrating technological, behavioral, and environmental aspects of energy systems.

**WSU Positioned To be A Leader:** WSU is in a strong position to be a leader in the sustainable, secure, and reliable provision of energy. The energy technology sector in the Pacific Northwest is one of the fastest growing industries in the region. Examples are Schweitzer Engineering Laboratories (SEL) in power grid protection, Alstom Grid in computer software and communication systems for power grids, and ITRON in smart meters for smart grid, all in the State of Washington. Hydropower has been the dominant renewable energy source in Washington State for the better part of the last century, but the wind power industry has gained significant traction in Washington State (top ten in installed wind energy capacity) with several key adopting energy companies and manufacturers of wind power components based here. In addition, PNNL has a leading R&D program in power and power systems that includes efforts in nuclear and fossil production as well as for the development of fuel cells and energy storage solutions. WSU researchers collaborate with PNNL and other research units across the world in developing improved materials and systems for these technologies. The 5 year, \$40M Northwest Advanced Renewables Alliance (NARA) and the Federal Aviation Administration Center of Excellence (based at WSU) are geared towards the development and production of bio-based fuels. Catalysis research in the area of fuel production is also a recognized strength at WSU. Radiochemistry research at WSU includes power generation and waste management topics, among other research areas and, along with collaborations with PNNL and INL, constitutes the strongest university-based radiochemistry research program in the country. Researchers associated with the Composite Materials Engineering Center (CMEC) and the newly established Center for Bioplastics and Biocomposites (CB<sup>2</sup>) at WSU are well-positioned to contribute to the needs of the wind-power industry as well as to energy conservation through light-weighting of components in the

transportation industry. The power engineering program at WSU is one of the top programs in the US. Through WSU Energy Systems Innovation (ESI) Center and the long term effort of the faculty, strong collaborations have been established with all key members of the energy technology sectors. The benefits for WSU research and education have been highly significant. On the industry side, Bonneville Power Administration, Avista, and Snohomish Public Utilities are industry leaders in developing and deploying smart grid and renewable energy technologies. More recently, the futuristic solar energy and energy storage technology companies have been established in the State of Washington. The State dedicated \$40M for Clean Energy Fund in this funding cycle. It is likely to grow in the future. These sectors of the energy technologies as a whole represent important opportunities in creating jobs for WA and the Pacific Northwest.

**Multi-Disciplinary, Inclusive Theme:** Faculty across WSU are involved in energy-related work and engaged in collaborative, cross-disciplinary efforts. For example, the sociology department has a long-standing national reputation in issues related to the environment, technology, and society. Sociology and engineering faculty are collaborating to understand factors contributing to the resilience of the electricity system, household energy consumption, and privacy concerns in the context of the smart grid. Psychology, sociology, and marketing faculty have expertise in factors that increase the likelihood that individuals and organizations will be able to cooperate to solve collective problems, and environment/energy-related problems in particular. Researchers in Chemistry, Physics and Materials Science have expertise in developing new photovoltaic materials and in increasing the efficiency of power production across the spectrum of possibilities. Engineering faculty have focused research in improved catalysts for energy production, energy storage, hydrogen-based alternatives as well as considerable expertise in systems design for energy production. WSU's traditional strengths in agriculture and biological sciences provide a strong base of expertise for addressing bio-fuel development. In addition, the School of Economic Sciences has highly research active nationally and internationally recognized faculty with expertise in many areas relating to energy use and production. Specific areas of strength are in energy, consumer behavior and demand analysis, contract and auction design, industrial organization, environmental and resource economics, and regulation. The opportunities extend to other colleges at WSU that provide expertise in related areas such as energy sciences, education, human factors, environment, and public policies. These existing and expanding multi-disciplinary teams will position WSU to be a world class leader in developing major programs with US government agencies, State of Washington, energy industry sectors, and other stakeholders. It is also a broad based, inclusive theme of opportunities for WSU's national and international leadership in the energy area.

## **WSU RESEARCH THEME WRITE-UP**

### **Exotic and Emergent Materials**

*A. E. Clark and M. G. Kuzyk*

Exotic materials have unusual properties due to their composition, structure (dimensionality) and surrounding environment (external stimuli). Emergent materials have physicochemical properties that derive from patterns and intermolecular interactions of molecules that themselves do not have those properties, i.e. the whole is much greater than the sum of its parts. Composition, dimensionality and environment can be varied together to provide great flexibility and control, resulting in a new genre of material science. This theme focuses specifically on matter with unusual composition and structure that can be applied to a variety of existing challenges such as energy generation and storage; can be used to develop new technologies such as ultrasmart morphing materials and self-healing materials; can enable new computing and information processing paradigms such as quantum computing and holographic information processing; and, has the potential to lead to transformative technologies.

The sub-themes overlap intellectually and in their applications, and include researchers from around the university from areas that include the physical sciences, engineering and the biosciences. Artists will make contributions using their abilities for visualization and can provide a link between art and science for educational outreach programs. There are clear ethical and economic repercussions of this line of research, which requires input from philosophers and economist. The integrated research that spans colleges will require a shift in present educational paradigms.

### **Sub Themes**

#### **Extreme Conditions**

Matter can be exposed to extremes of temperature, stress, radiation, electric fields, light, and chemical environments. For example, matter undergoes transitions into the plasma state at high temperature and into quantum condensates at low temperature. In addition to the neat science that inspires wonder and awe, such as the low-temperature Bose-Einstein condensate in which every atom is in the same state, like ghost s that occupy the same physical space at the same time, important applications include quantum computing and encryption while plasmas can be used as fuel that can be harnessed by reactors. As another example, radiation-resistant materials are essential for space applications while radiation hardening can be used to make existing materials stronger. High light intensities are used for machining tiny structures, but can also induce nonlinear effects in materials to control one beam of light with another like a transistor controls electrical currents, leading to applications in optical computing and high bandwidth telecommunications.

#### **Hybrids**

Composite materials are made from combinations of materials that are not normally found together in nature. These may be materials that are highly energy efficient and lightweight due to the melding of natural and wood fibers with state-of-the-art polymer blends. Alternatively, biological enzymes can be confined in carbon-based matrices to develop new biologically inspired energy conversion technologies.

Different metal combinations in combination with extreme condition treatments can result in superconductive composites at effectively room temperature. As another example, high intensity light can induce a change in the shape or size of a material, but artificially-designed materials such as dye-doped liquid crystal elastomers can be made to change shape under low light intensities. Such materials can be used to make optical actuators and are an important part of the technological toolset needed to make devices that integrate logic, sensing, actuation, and information transmission -- all in one part of a material.

### **Dimensionality - Surfaces and interfaces**

The dimensionality of a material can have a profound effect on its properties. For example, the character of a phase transition (for example liquid to solid or magnet to nonmagnetic) can change or even disappear. Two dimensional structures such as surfaces and interfaces can take the form of common geometric shapes, such as spheres (bubbles) -- that have the smallest surface to volume ratio and can be used to isolate the inner volume from the outside (like living cells); and planes (thin layers) -- that have the largest ratio and provide many interaction sites for catalysis. From biomass to solar to nuclear power, interfacial interactions between states of matter fundamentally influence the efficacy of a systems function and form a foundational role in development of next generation technologies. Existing institutional thrusts in Clean Technologies, Energy, the Environment and Materials rely upon a multiscale effort for characterizing the structure and reactivity of dissimilar materials across temporal and spatial scales so as to optimize performance and inform rational design strategies. Significant research and technology opportunities exist within this domain that encompass three major colleges on campus: VCEA, CAS, and CAHNRS. This research theme coalesces basic science and transformative engineering efforts with significant impact for local economic, national security, and global energy and environmental paradigms.

### **Self - Assembly and Emergence**

Self assembly and emergence are natural processes that enabled evolution and gave birth to intelligence. Harnessing these forces, we can intentionally design artificial complex materials and systems with ultrasart functionality that can be applied to many of the problems that challenge modern society. For example, aggregating molecular building blocks can be use to make nanostructures that increase solar energy conversion; nanoparticle assembly that can act to detrimentally influence fuel cell performance can be mitigated; and protein-protein assembly into deleterious aggregates/plaque associated with neural diseases (Alzheimers) if understood could be interfered with using external influences. Mass transport is an essential feature of fuel cell and battery technologies, recycling strategies in nuclear energy and biomass conversion efficiency. Transport processes are affected by organization and dynamics at the interface which dictates transport efficiency and kinetics, so links the self-assembly theme with surfaces and interfaces. Complex systems made of simple subsystems can lead to emergence; i.e. behavior that is far more complex than the sum of a system's parts. Such pie-in-the-sky research could lead to transformative technologies that would otherwise not be anticipated.

## Summary of Sub-Themes and Research Activities

The sub-themes are summarized below.

### Extreme conditions

- Thermo-Mechanical
- Chemical
- Radiation
- Electric
- Optical

### Hybrids

- Nano-composites
- Polymers and Elastomers
- Quantum Materials
- Molecular Nano Materials

### Surfaces and Interfaces

- Layered materials
- Multiphase
- Bi-lipid layers
- Thin Films/coatings
- Reactive surface

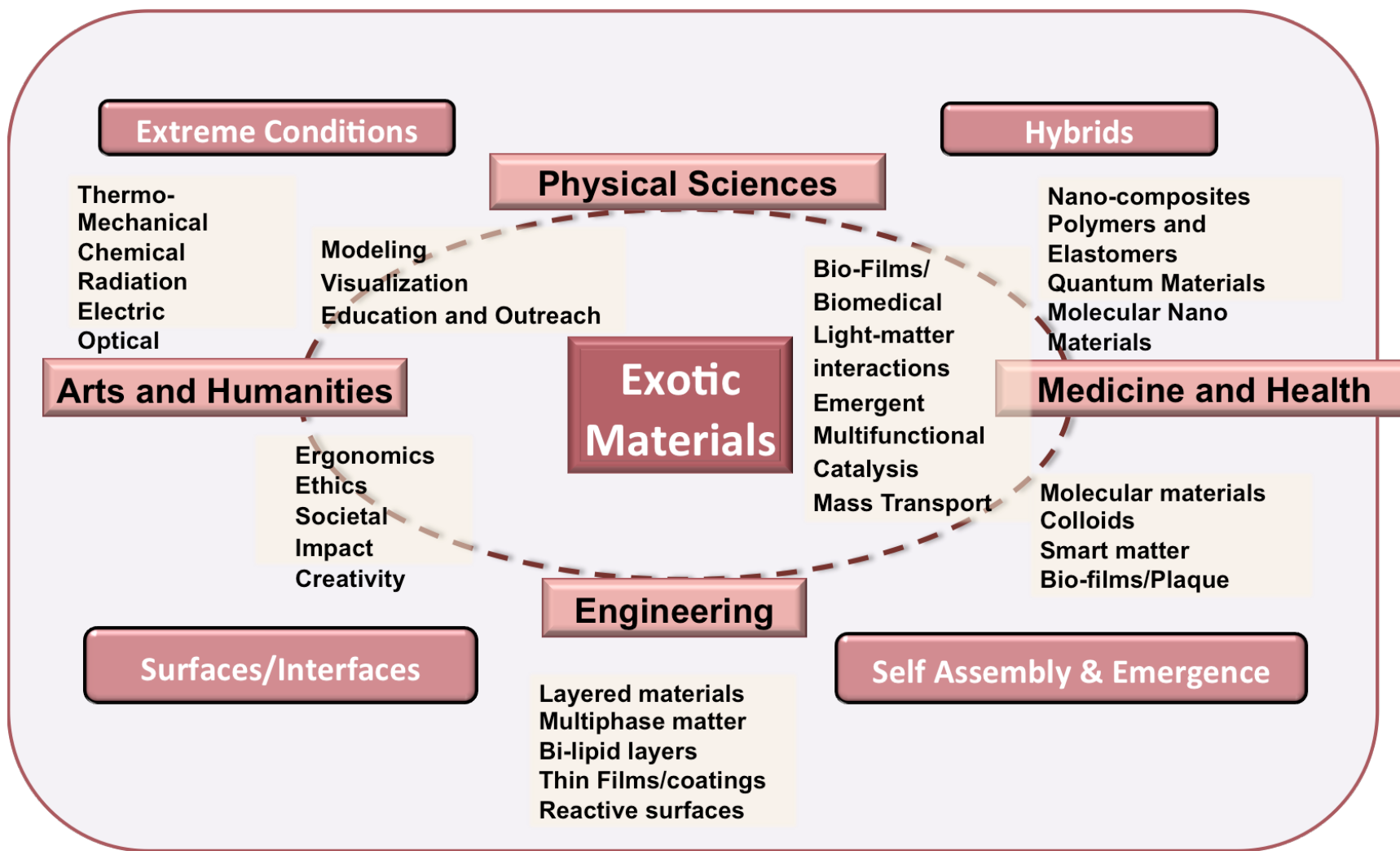
### Self Assembly & Emergence

- Molecular materials
- Colloids
- Smart matter
- Bio-films/Plaque

A broad range of existing research activities fall under Exotic Materials, including

- |                              |                             |                             |                            |
|------------------------------|-----------------------------|-----------------------------|----------------------------|
| • Adhesion                   | • Cold quantum gases        | • Medical implants          | • Promotion of cell growth |
| • All-optical devices        | • Constitutive Relations    | • Microstructure evolution  | • Quantum computing        |
| • Bacteria growth inhibition | • Electro-optics            | • Molecular Design          | • Quantum design           |
| • Batteries                  | • Electronic junctions      | • Molecular processes       | • Quantum encryption       |
| • Bio-economy                | • Equation of State         | • Morphing materials        | • Radiation tolerance      |
| • Bio-Films                  | • Light-matter interactions | • Multifunctional materials | • Sustainable materials    |
| • Bio-fuel                   | • Magnetic materials        | • Phase diagrams            | • Smart materials          |
| • Brain Stimulation          | • Mass transport            | • Photomechanical effects   | • Solar Cells              |
| • Catalysis                  | • Materials Discovery       | • Piezoelectrics            | • Strong/Light materials   |
| • Clean energy               | • Mathematical Modeling     |                             | • Surface processes        |
|                              |                             |                             | • Transport properties     |

The scope of exotic and emergent materials research is diagrammed below, which shows the sub-themes, research areas involved, and some examples of the synergisms between them.



## Meeting our charge

1. Materials are the foundation of everything. The more mundane materials that nature provides has driven much of the technology that makes our lives better. Exotic materials live in the domain of environments and compositions that are outside the natural realm. Given the large number of parameters that can be varied, Exotic material properties can be intentionally manipulated to suit the needs of an application. Smart materials that change shape based on chemical environment would have medical applications as smart in-vivo drug dispensing units. Materials that control the flow of light with light could be used to make the next generation of computers and provide the infrastructure that would revolutionize computation, modeling, and information science. As a subset of the materials innovation enterprise, the establishment of a fundamental knowledge of the properties of materials in extreme environments underpins the process for optimizing the performance, safety, reliability, and sustainability of components and systems for end-use applications characterized by extreme operating conditions. For example, future energy and environment technologies will place increasing demands on materials' performance with respect to extremes in stress, strain, temperature, pressure, chemical reactivity, photon or radiation flux, and electric, magnetic, or optical fields (Report of the DOE Office of Basic Energy Sciences, February 2008).

2. Existing researchers span all the proposed activities, so WSU is well positioned to be a pioneer in this area. A small sampling (not meant to be exhaustive) includes of areas represented include:

1. Thermo-mechanical extremes (Mailhot, Yoo, Gupta, Hawreliak, McCluskey, Zbib): Thermal properties (equation of state) and constitutive properties (mechanical response) of materials, phase diagrams, strength, plasticity, fracture and failure.
2. Chemical extremes (Hipps, McEwen, Banerjee, Kruse, A. Clark, S. Clark): Surface processes, coupled chemical-thermomechanical-electromagnetic environments, solvation environments.
3. Radiation extremes (Zbib, McCloy, S. Clark, N. Wall): Microstructure evolution in radiation environments, microstructure-engineered materials for radiation-tolerant properties, radiochemistry, actinide chemistry.
4. Electro-optical (EO) extremes (I. Dutta, Kuzyk, Watkins, Alex Li): Materials in extreme electric fields, light-matter interactions, transport properties.
5. Molecular processes under extreme chemical, thermodynamic, and electric field conditions (Hipps, McEwen, Kruse)
6. Self-assembly and emergent materials (W. Dong, J. McHale, K. W. Hipps, U. Mazur, S. Ha)
7. Composites (M. Kessler, M. Wolcott, J. Zhang, K. Zhong, K. Englund)
8. Quantum design and barochemistry for materials discovery: (Mailhot, Yoo, McCluskey, A. Clark)
9. Mesoscale modeling in realistic and extreme chemical environments (Zbib, A. Clark, J. S. McEwen, Banerjee, Field)
10. Photomechanical materials (Kuzyk)
11. Quantum Gases(Blume, Forbes, Engels)



## Summary of researchers and their affiliations

### CAS:

D. Blume: Physics - Cold quantum gasses - theory

Aurora Clark: Chemistry – computational chemistry, solution chemistry, interfacial chemistry, actinide chemistry

Sue Clark: Chemistry – radio-chemistry, actinide chemistry

P. Engels: Physics - Cold quantum gasses – experimental

M. Forbes: Physics - Cold quantum gasses and neutron stars - theory

Yogendra Gupta: ISP – dynamic compression

James Hawreliak: ISP – laser-driven dynamic compression high-energy density materials science

Kerry Hipps: Chemistry – Scanned probe imaging of molecular processes at surfaces in chemical and electric fields

M. Kuzyk: Physics - Photomechanical materials, nonlinear optical materials, self-healing materials

Christian Mailhot: CAS/ISP – Quantum simulation of matter, quantum design of materials

U. Mazur: Chemistry – self assembly of materials on surfaces

Matthew McCluskey: Physics – high-pressure research, semiconductor physics

M. Valipuram: Mathematics – Mathematical and computer modeling of nonlinear phenomena.

Nathalie Wall: Chemistry – radiochemistry, actinide chemistry

D. Watkins: Mathematics - Simulation of quantum properties of nonlinear materials

Choong-shik Yoo: ISP/Chemistry – high-pressure chemistry

### VCEA:

Soumik Banerjee: MME – computational nanoscience for advanced clean energy technologies

W. Dong: Voiland School of Chemical Engineering and Bioengineering – phase shifting materials, self-assembly and emergent behavior associated with aggregation

Indranath Dutta: MME – Investigations of electromigration processes in extreme electro-optical fields

Dave Field: MME – stereography, materials interfaces

Su Ha: Voiland School of Chemical Engineering and Bioengineering – enzyme based fuel cells, emergent behavior associated with confinement

Norbert Kruse: Voiland School of Chemical Engineering and Bioengineering – heterogeneous catalysis

Ananth Kalyanaraman: EECS – Computer and data science / High-performance computing

M. Kessler: MME – adhesion and novel composites

John McCloy: MME – Ceramics, amorphous materials, magnetism

Jean-Sabin McEwen: Voiland School of Chemical Engineering and Bioengineering – Ab initio simulations of catalytic processes at surfaces under extreme conditions

Sinisa Mesarovic: MME – Multiscale modeling of thermomechanical properties of materials

Wolcott: CE – natural composites

Hussein Zbib: MME – Simulation of microstructure evolution on materials in extreme radiation environments

## 3. Must do

4. A well defined thrust area in exotic materials would unify all researchers from around campus and would encourage subsets of individuals to partner in submissions of new proposals and to form new centers. A small number of key hires in prioritized areas would cement the existing researchers into a cohesive group.

**WSU RESEARCH THEME WRITE-UP**  
**Information Driven Research**  
*(identified as Big Data in Original 120 Day Committee list)*  
*Aurora Clark, Mark Kuzyk and Don Dillman*

### **Peta-Scale Information Processing**

Peta-scale information processing refers to the transmission, generation, manipulation, and analysis of huge data sets to extract information and build a body of knowledge that can solve important problems and sets the foundation for future innovation. Information may come in the form of interrelated associations of data elements where patterns are buried in the interconnections between the data -- making information processing a complex task that requires the development of new algorithms, new hardware architectures, and even the use of altogether new physical processes that go beyond electronics. Developing peta-scale information processing technologies with a focus on existing critical needs at the forefront of information dense research will stimulate the development of novel solutions for future problems.

### **Sub Areas**

#### **Computations Paradigms**

This sub area seeks to develop new software and algorithms that can handle large and complex data sets; and, to rethink standard analysis methods with the goal of developing novel ways of treating data, such a neural network approach that percolates through data sets instead of data being treated from the top down.

#### **Hardware Paradigms**

Computer systems traditionally are designed to operate serially. The availability of GPUs provides an alternate way to speed up processing through dedicated hardware. Designing altogether new hardware architectures and methods for coding could leapfrog existing bottlenecks. Forward looking basic research into new architectures based on novel phenomena such as all-optical information processing, quantum computing, and spintronics could lead to breakthroughs that have significant advantages over existing electrons technologies.

#### **Analytics**

Analytics encompasses a broad range of algorithms that generally utilize the premise of categorization, pattern recognition (network analyses or graph theory), process optimization and data reduction to examine large sets of data toward the goal of discovering new phenomena in the natural world. Analytics techniques are quite general – with the same algorithms used in STEM, as well as social science domains. Analytics complements and enhances the traditional problem-solving archetype within research, empowering scientists to effectively utilize and optimize available resources in their research to produce defensible results with maximal information content. Common data sets may be heterogeneous, dynamic, require coupling of length and time scales, and have complex relationships between variables. This necessitates the partnership of computational, science, and engineering domains to enable new advances that address and solve key data analytics stop-gaps and have maximal impact across a broad range of disciplines. Finally, analytics transcends research activities into project management training, which includes marketplace evaluation, intellectual property management, and entrepreneurship.

## Data Collection

The challenges of processing and analyzing huge data sets extends to the social sciences. The social sciences we have relied on sample surveys of specific populations and used statistical inference based on probability theories to describe attributes and relationships that exist in humans and organizations. Increasingly, administrative records make it possible to obtain and analyze information for all members of a group. When such data is available, and provides comparable information across all groups, it becomes possible to examine connections among variables that sample surveys do not facilitate because of sample size limitations. However, most large scale administrative and behavioral records do not contain all of the information needed for testing theories about the causes and consequences of human and organizational behavior. Thus, one of the Big Data challenges we now face is how to connect sample survey information with administrative records. Another set of emerging issues is new methodologies that social scientists have not previously been able to do because of computer limitations or which simply did not exist. An example of the former is “social network” analyses which involve simultaneously looking at all possible relationships among hundreds or even thousands of individual units. An example of the latter is Geographic Information Systems (GIS) which allow the appending of precise geographic information to data sets that contained only unorganized address information. GIS applications open up the possibilities of combining information from many sources into single analyses that will produce precision unthinkable only a decade ago.

## Meeting our charge

1. This line of research is of high impact to the state in areas of bioinformatics applications to agriculture, environment, and energy; statistically-based research in social science that can be applied to improved governance; and applications to Washington State's high tech industry that makes products with many parts that need to work flawlessly together in a complex system. The knowledge generated by this line of research will also have a broader national impact based on industry's and government's need to make intelligent decisions based on complex information.
2. WSU is well placed to be a pioneer in this area because existing researchers span all the proposed activities. For example, researcher that generate large amounts of data can be involved in and benefit from research that seeks to find novel ways of data analysis. Existing researchers who study mathematical algorithms and neuroscientists who study cognitive processes in the brain could contribute to new approaches for crunching data and recognizing patterns in complex data sets. Researchers who make and study novel materials, in which their constituent parts interact with each other or with light/electricity/sound could provide ideas for totally new physical processes that perform computations holographic ally, that is through global interactions without the need to interrogate the individual parts to get useful information.
3. Must do
4. A well defined thrust area in peta-scale information processing would unify presently disjoint researchers from around campus. Simple activities such as common seminars and the formation of loose associations of researchers with common interests would foster better communications, encourage collaborations and to lead to joint proposals. A few key hires would bring it all together.
5. Metrics: Significant publications

## **WSU RESEARCH THEME WRITE-UP**

### **Smart Infrastructure - *Transforming our infrastructure to support vibrant and healthy environments***

#### **How it is inspirational, inclusive and multidisciplinary**

America is facing great challenges from severely deteriorated infrastructure. The American Society of Civil Engineers (ASCE)'s report card graded American's infrastructure around "D", which was mentioned numerous times in the presidential debates and State of Union address. What makes it worse is the dwindling funds for infrastructure. As a result, Americans have to deal with potholes in cracked roadways, collapsed bridges, broken pipelines, flooded areas, crawling vehicles/trains, and so on, which directly or indirectly lead to fatalities. Durability and resilience are keys to a healthy infrastructure to support economic growth in Washington and beyond. Infrastructure directly impact people's living conditions and requires concerted efforts to reverse the current trend and jump-start the next-generation infrastructure. This requires integrated and innovative approaches in fields of materials, design, construction, management, economics, and sociology, as well as modern technology.

#### **Research strengths**

WSU researchers have been at the frontline to build sustainable infrastructure through cooperation with industry, local, state and federal governments. The coherent efforts consists of multidisciplinary collaboration to develop systematic solutions as follows:

1. Innovative policy and financing for infrastructure. The severely inadequate funds for infrastructure demands creative financing strategies, such as privatization, tolling, and alternative financing. The College of Agriculture's Freight Policy Transportation Institute is an exemplary entity to address such issues.
2. Innovative and renewable infrastructure materials. Current infrastructure materials are expensive and non-renewables, which consume significant amount of energy and leave a significant environmental footprint. For instance, production of one ton of cement produces nearly one ton of carbon dioxide. WSU has been the leader in developing durable and renewable materials for infrastructure, such as bioasphalt by the Washington Center for Asphalt Technology (WCAT) or renewable bioplastics and bio-composites by the Composite Materials and Engineering Center (CMEC), which demonstrates our potential and leadership in this field. There are also ongoing WSU efforts in the value-added utilization of byproducts and waste in environmentally friend concrete materials.
3. Sustainable design. Sustainable infrastructure design accounts for safety, energy efficiency, and livability. The Institute of Sustainable Design of WSU has be well recognized for its pioneering work in low impact development, sustainable transportation, and green buildings.
4. Innovative construction. The infrastructure construction process can be accelerated to reduce the interruption of the public's life and save costs. Streamlined construction planning and innovative construction procedure could greatly reduce construction time from years to months and cut construction costs. The established construction engineering program of CEE and School of Design and Construction at WSU fit this challenge well.

5. Smart infrastructure. Lives can be saved to avoid catastrophic failure of infrastructure. Smart structural health monitoring can detect the emerging risks or defects in the structures in early stage, while smart materials are capable of mitigating disasters and hazards and actively controlling structural behaviors. The unit like Smart Structures Lab of WSU can contribute to developing innovative infrastructure health monitoring and disaster mitigation technologies using smart materials and wireless communication systems.

**Barriers**

- A WSU organizational structure is needed that incentivizes and rewards cross-discipline research.
- High quality research facilities are needed that are open to researchers across departments, schools and colleges.
- Technical support staff are needed (supported with State funds). Grants already support faculty summer months, post-doctoral fellows, and graduate students. Researchers need help at least with permanent technical staffing that is required if laboratories are to be shared, especially to address issues such as safety, training and oversight.

## **WSU RESEARCH THEME WRITE-UP**

### **Sustaining Human Health**

#### **1. Theme/Subthemes**

##### **Main Theme: Sustaining Human Health**

- At local, state, national, and global levels
- Across lifespans and generations

##### **Subthemes**

- Agriculture, Food, and Nutrition Science
- Basic Health Research
- Optimal Natural, Social, and Built Environments
- Health Science Translation to all Relevant Stakeholders

#### **2. Brief discussion of the challenge and how it is inspirational, inclusive and multidisciplinary**

There is nothing more emotional to individuals and families nor fundamental to life than improving overall health and wellbeing. Consequently, one of the most pressing and **inspirational challenges** we face today is understanding what constitutes optimal health and how it can be sustained, for only when we understand “normal” can we prevent and treat disease. Indeed, advances made over the past century related to health and wellbeing have resulted in an unprecedented increase in longevity, accompanied by a shift from infectious disease-driven mortality to that due to chronic degenerative conditions such as obesity, cancer, cardiovascular disease, and type 2 diabetes. This shift, along with revolutionary advances in research technologies, has transformed investigation and exploration in health science toward a focus on interdisciplinary collaboration coupled with science-driven outreach and translation with a goal of extending both the quantity and quality of life for not only Americans but also the global population.

Washington State University is uniquely positioned to not only successfully tackle many aspects of the ever-present societal challenge of improving human health, but also developing methods and insights as to how enhanced human health can be sustained on local, national, and international levels. This ability is rooted in several distinctive aspects of WSU. For instance, the **University’s land-grant mission** not only supports a large number of highly productive and successful faculty committed to improving agricultural practices and output (thus enhancing food production, quality, and availability) but also to providing outreach to the myriad and varied stakeholders who benefit from this information. The **Allen School of Global Animal Health** adds an important and unique dimension to this capacity, as it provides an unparalleled interface between animal agriculture and human health on a global scale. WSU is also home to a large contingent of scientists and clinicians actively engaged in **both basic and applied health-related research and translation**. These faculty are housed on all campuses and in a wide variety of departments and units – thus representing a profoundly **inclusive and multidisciplinary** cadre of experts who can collectively tackle our most pressing and complex, health-related problems. Other perhaps less obvious yet no-less-important aspects of human health which are of great interest to many WSU researchers include optimization of **natural, social, and built environments** in such a way as to improve the air we breathe, the water we drink, and the societies and buildings in which we work and live. Although not typically thought of as being related to “human health,” these research activities

clearly improve the lives of people across the lifespan and around the world. As such, they actually represent integral aspects of how WSU faculty can creatively and interdependently contribute to sustaining human health on very comprehensive and holistic levels.

**3. Faculty strength, infrastructure capability, sponsor interest, and importance for maintaining intellectual diversity and creative environment.**

1. WSU is the only university in the state with:
  - a. land-grant mission and committed focus on agriculture;
  - b. dedicated “extension” program tasked with disseminating agriculture, foods, nutrition, and health information (including food security) to citizens in the state of Washington;
  - c. food science program; and
  - d. capacity to implement and translate science that spans from “farm to fork.”
2. WSU Spokane’s Health Sciences campus and others (e.g., Vancouver) faculty offer excellent opportunities for both basic and translational sciences including foci on:
  - a. interprofessional education, research, and practice; and
  - b. community engagement and rural health.
3. The Paul Allen School of Global Animal Health (Pullman) is dedicated to human health through optimizing animal agriculture and the intimate interface between availability and acceptance of animal-based foods (e.g., meat, dairy, eggs) and human health, especially as it relates to maternal/child health.
4. The Murrow Center for Media and Health Promotion Research (Pullman) helps individuals and health professionals use media most effectively to facilitate informed and healthy decisions.
5. The Sleep and Performance Research Center (Spokane and Pullman faculty) focuses on the effects of sleep deprivation on cognitive performance, ranging from simple reaction time to complex decision making, and overall health.
6. The Center for Reproductive Biology (all campuses) includes expertise associated with a variety of areas related to reproduction, including nutrition, ovarian function, fertility (male and female), and breastfeeding.
7. Substance use and addictions research programs across the state address the continuum from basic to applied research; for instance the Alcohol and Drug Abuse Program (Pullman), Translational Addiction Research Center (Pullman), and Program of Excellence in Addictions Research (Spokane and Vancouver).
8. Certificate in Health-Assistive Smart Environment Design (IGERT)
9. World-renowned (and paradigm-shifting) expertise in relationship between early exposure to environmental “contaminants” and life-long and trans-generational health
10. Small but internationally-recognized presence of faculty conducting research in social aspects of human health across the lifespan (child development, psychology, anthropology, etc.)
  - a. Particularly in domestic and global maternal and child health, including food security and nutrition
11. Significant federal, state, and private sponsors of funding, including agricultural commodity groups, food industry, pharmaceutical companies, USDA, NIH, Bill and Melinda Gates Foundation, and NSF.

**4. Identify barriers and recommendations to improve environment**

1. Lack of core service centers and staff needed for state-of-the-art bioinformatics and computational biology (“data analytics”)

- a. This is absolutely essential for individuals attempting to conduct “-omics” research, especially with large and complex data sets
- b. The availability of service staff (rather than research faculty) to assist with data acquisition, bioinformatics, and computational aspects is emphasized; although we are beginning to attract younger faculty who are trained in these areas, we have many established researchers who would like to move into these realms; staff dedicated to help all faculty reach these goals is essential for WSU to stay current in many areas of human health research
2. Lack of basic infrastructure needed for conducting important types of human health research (e.g., psychophysiological, neuro-imaging facilities, human metabolic unit, biological sample collection rooms and dedicated laboratories) on the Pullman campus
3. Lack of clinical data repositories that are HIPAA-compliant and secure
4. Human health research resources are at maximum—although current services are excellent, more infrastructure in OGRD, including IRB and IACUC is needed and will be required as human health-related research increases
5. Difficulties with relocation and/or loss of some of the basic health sciences to Spokane – loss of critical mass in some critical and highly fundable areas (e.g., nutrition, pharmacy)
6. Institutional trend toward *not* referring to non-Spokane-based programs as being in the “health sciences”
  - a. This has created an unfortunate hierarchy and has built walls that make collegial collaboration more difficult than it should be
7. Lack of connection among campuses for faculty conducting teaching/research in health-related areas
8. General lack of critical mass in several important research areas (e.g., nutrition, science education, science communications)
9. Many excellent, well-trained research faculty in human health areas are currently overloaded with excessive teaching and advising responsibilities
  - a. Disparate teaching/advising loads across university units (e.g., SBS, SMB, GSAH)
  - b. This is even more exaggerated across campuses

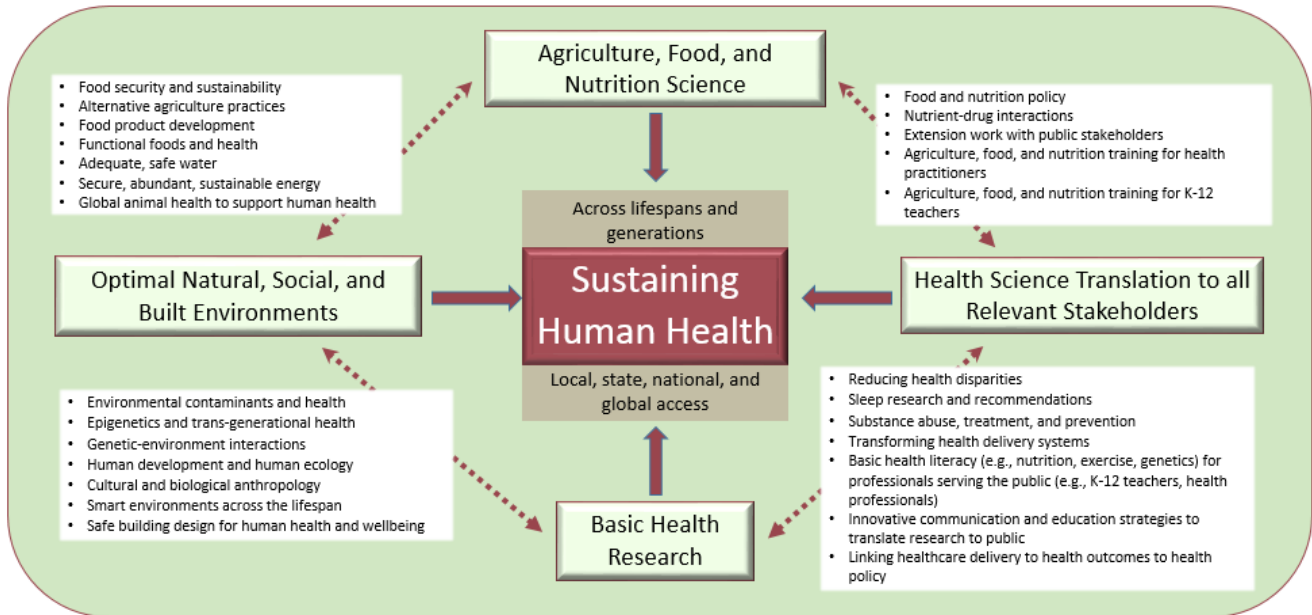
### **5. Recommendations to improve environment**

1. Increase number of tenure-track research faculty dedicated to conducting human health research, and allow sufficient appointment expectations so that they can devote needed hours to research
  - a. Lower teaching and advising loads will lead to increased grant writing and procurement
  - b. Evaluate equity in teaching/advising loads among health researchers across different colleges, campuses, and units
  - c. Consider holistic needs and potential strengths of all campuses in this regard
2. Establish bioinformatics/computational biology service center dedicated to helping human health researchers envision, propose, and analyze research involving large (e.g., -omics) datasets
3. Support internal and/or external training modules to help established faculty move into “-omics” research in order to remain competitive at the national level; this would necessarily include training on computational aspects of manipulating and interpreting “big data” comprised of diverse metadata
4. Direct additional resources to boost infrastructure in OGRD to support faculty wishing to pursue grants (both small and large) focused on human health



5. Proactively encourage and promote collegial, professional relations among faculty conducting similar and/or complementary research within and among all campuses – especially when interdisciplinary approach is needed to solve major human health challenges
  - a. Create “divisions,” seminar series, topic-related retreats, etc.
  - b. Establish dedicated position to help health-sciences faculty identify grant opportunities and then work with them to submit interdisciplinary grants
  - c. Foster positive interactions and collaborations among health-related faculty in different colleges and units (e.g., SGAH, SBS, SMB, VCAAP, Bi-state SFS, NEP, Nursing, Anthropology, Child development, Pharmacy, etc.)
  - d. Consider friendly relocation of faculty to best nurture creation of critical mass and ease of working together among faculty with similar expertise and interest (e.g., cancer researchers, sport/kinesiology researchers, foods and nutrition)
6. Build (or remodel/repurpose) facility to allow basic human health research on the Pullman campus
7. Reconsider recent decision to not support basic undergraduate/graduate human nutrition science undergraduate and graduate programs on Pullman campus
  - a. Human nutrition is currently a highly fundable research endeavor. Very few research-active faculty engaged in basic human nutrition research remain at WSU (on any campus) due to relocation from Pullman to Spokane and reconfiguration of the remaining Spokane-based program to focus on dietetics and exercise (a narrow vision of nutritional sciences)
  - b. Reconfigured human nutrition program could easily interface with several units on campus, including SGAH and Bi-state SFS
  - c. Reconfigured nutrition program could be co-located between Pullman and Spokane (not mutually exclusive)
8. Establish internal grants program to foster new (often interdisciplinary) or expanded visionary research among teams of WSU researchers with expertise in different areas of human health
  - a. Would provide important trust-building foundations for interdisciplinary work among complementary faculty – this aspect of trust is critically necessary for successful and sustainable interdisciplinary research
  - b. Would generate preliminary data, publications, and evidence of successful collaboration needed to successfully compete for federal and private grants (e.g., NIH, Bill & Melinda Gates Foundation)
  - c. Examples: collaborations among architecture/engineering/psychology faculty to study mental health benefits of various built-design models; collaborations among anthropology/veterinary/nutrition faculty to study relationships among global household dynamics, partitioning of foods among family members, and growth of children
9. Strengthen infrastructure (including staff) to support global human health research
  - a. Expand travel grant program to encourage collaboration with international partners

6. Graphic



## **WSU RESEARCH THEME WRITE-UP**

### **Main Theme: Water Research and education**

Water is integral to every biological process on earth and is critical in myriad ways for human welfare. Water is a necessary foundation for food and energy production, and water access and quality is a fundamental determinant of human health. Water provides valuable ecosystem services and recreation benefits, but also plays a central role in hazards such as flooding, landslides, wildfire, and sea level rise. The hydrologic cycle plays an important role in both responding to and driving global change. Far-reaching implications include those for air quality, climate, and the health of the biosphere. An environment in flux calls for new science with a new vision for scientific pursuit. WSU has a strong foundation for providing high marginal benefit and cost-effectiveness through a sharper focus on and additional investment in water research. A concerted and integrative would enable researchers across the university to identify collaborative overlap, and would provide the potential to greatly strengthen WSU's existing capacities and reputation in this crucial research area.

#### **Subthemes**

- Theme 1: Water quantity and quality.
- Theme 2: Excess water, hazards, and infrastructure.
- Theme 3: Water and the inter-connected Earth system.
- Theme 4: The water-energy nexus.
- Theme 5: Water and International development

#### **Theme 1: Water quantity and quality.**

In much of the arid western United States, surface water is more or less fully appropriated, groundwater declines are widespread, snowpack as a storage mechanism is threatened by climate change, and water quality declines due to nutrient leaching, stormwater runoff, and other contaminants such as endocrine disruptors all have important consequences for economic growth, resilience, and sustainability, and are inducing important management and policy changes in response. Washington State's diverse and changing climate and demographics, from west to east, are a microcosm of these global changes. However, human history shows an astounding potential for technological development and institutional change in the face of challenges, with numerous opportunities that may be developed through new research activities. Research in this theme focuses on water supply, demand, and contamination issues and their solutions by integrating physical and natural sciences with engineering and the social sciences.

#### **Theme 2: Excess water, hazards, and infrastructure.**

: Excess water, hazards, and infrastructure. When in excess, water can become catastrophically destructive. The 1948 Columbia River spring flood caused major damage along the entire river and completely destroyed Vanport, a major city in Oregon; the 1964 Columbia River Treaty, which is currently in review, arose to a large extent because of this event. Water also weakens the structural properties of our soils. In March of 2014, the Oso mudslide in western Washington State engulfed an entire neighborhood, killing 43 people. Climate change (with the associated potential for more frequent and intense extreme events), continued population growth and development of our state and region, and our aging infrastructure together result in a critical vulnerability of our society. Research in this theme focuses on emerging approaches to design, maintenance, and preservation of both physical and

institutional infrastructure to increase the resilience of built and managed environments to global change.

**Theme 3: Water and the inter-connected Earth system.**

Water and the inter-connected Earth system. Water and energy drive the connections between land and atmosphere, land and ocean, and the shallow subsurface and deep subsurface. In a warming world, the hydrologic cycle is intensifying and atmospheric circulation patterns are shifting, with cascading impacts. A warmer atmosphere holds more water vapor, further enhancing the greenhouse effect, and resulting in the potential for more frequent and extreme droughts and storms. Humans are also directly impacting the hydrologic cycle through changes in land use, emissions of aerosols that can affect precipitation formation, and water resources development (dams, diversions, groundwater abstractions, etc.). These changes in the hydrologic cycle can result in numerous and sometimes drastic impacts to society and the environment. For example, warming coupled with more extreme droughts increases the vulnerability of our forests, rangelands, and croplands, causing them to be more susceptible to disease and invasive species. Research in this theme seeks to understand the Earth system “as a system”, necessitating tight collaborations between, e.g., atmospheric scientists, hydrologists, ecologists, economists, and social scientists to characterize these linkages and to develop strategies that promote adaptation to global change while minimizing unintended consequences.

**Theme 4: The water-energy nexus**

The water-energy nexus. Energy and water are tightly inter-dependent. Water is used to produce electricity through cooling thermal power plants (accounting for 39% of all freshwater withdrawals in the United States) and through hydropower generation, an important source of renewable energy. The Grand Coulee Dam on the Columbia River is the largest hydropower producer in the United States; in 2013, Washington State was the leading producer of hydropower in the country. Furthermore, pumped-storage hydroelectricity is the largest-capacity form of available grid energy storage; water is pumped to higher reservoirs during periods of excess generation capacity and released for generation during periods of higher energy demand. Hydraulic fracturing provides the economic benefits of readily accessible hydrocarbon-based fuels, but at the expense of depletion and contamination of our freshwater. Water is a critical input in the production and processing of biomass feedstocks for energy. Conversely, energy is needed to make clean water accessible and to protect our environment, as energy is required to transport and treat water for municipal and industrial purposes both before and after use. This research theme brings together water resource, environmental, power, and computer science engineers with economists and other social scientists to find solutions that jointly promote water and energy sustainability.

**Theme 5: Water for International development and global health**

Water access and quality is among the most fundamental determinants of health and economic development outcomes throughout the world. The Water for Poor Act makes access to safe water and sanitation for developing countries a specific policy objective of the U.S. foreign assistance. Many development programs, such as the Water, Sanitation and Hygiene (WASH) program, recognize the importance of the interface of technology innovation, behavior change, sanitation and market development; and bringing sustainable services and the institutional structures to sustain them to un-served populations.

### **Existing Capacity**

Washington State University has been working on the critical issues of water across the spectrum of challenges, from climate change models for the hydrologic cycle and their impact on water management in Washington State to water from human powered irrigation pumps in sub-Saharan Africa. Our efforts include the impact of water on animal and human health as well as public engagement in environmental issues. WSU's water team includes faculty from across campus in the colleges of Agriculture, Engineering, Science, Liberal Arts, Veterinary Medicine and Nursing. We believe that a major challenge to sustainable development of the world's critical water resources is closing the gap between sophisticated modeling efforts and creating behavioral changes at the individual and community levels. Advanced modelers need collaborators on the ground working with the real life challenges faced by the adopters of innovative changes.

WSU researchers have been very successful in recent years acquiring and carrying out water-related research. Indeed, we have approached the full capacity of our faculty and broader research community to develop water-related grant proposals, complete awarded grant research, and publish. WSU is increasingly recognizing the importance of water research, education, and outreach. For example, CAHNRS has recently identified water as a primary "Emerging Theme", while VCEA has identified air and water resources as one of its top three "Signature Areas" for strategic investment. This is a clear indication, and recognition at the college level, that WSU is poised for substantial gains from additional investment in water research and education, and that the marginal gains in terms of research, education, extension, and extramural funding from investments can be large, and these college-level efforts should be pursued as part of a larger Grand Challenge vision at WSU.

### **Opportunities and recommendations**

Investment in water research should come in several forms, with the broader mission of WSU as a Land Grant University in mind. The short list of recommendations below is not exhaustive, and some of them were recommended to CAHNRS as part of a report submitted by the Dean's Taskforce for Water Resource Management, completed in April of 2014.

First, WSU needs to recognize and act on a need for heightened university-wide coordination around water activities. The funding environment increasingly prioritizes interdisciplinary research projects that involve large research teams with tightly integrated research, education, and outreach activities. Water research is at the forefront of this transition, as achieving water sustainability and resilience requires this broad participation. Land-grant universities, in particular are well poised to solve problems related to water sustainability, in large part due to a long history of involving stakeholders in solution-based research activities (Gold et al. 2013). Efforts at coordination such as this can benefit from a clear leader. The State of Washington Water Research Center (SWWRC) is an ideal entity to provide leadership in building these important connections within WSU. Housed in the WSU Office of Research, it can act as a clearinghouse and driver of water research across the university community in coordination with other centers (CEREO, CSANR, ESIC, IGIS, IMPACT, ISD, WSC, etc.). Beyond WSU, the Center is a member of the National Institutes of Water Research, which provides an ideal foundation for collaboration across the United States and beyond.

Second, consideration of a recently proposed Water Resources Innovation Center to focus efforts on the nexus between water and international development. Historically and based on its primary funding base, the State of Washington Water Research Center has as one of its core missions an emphasis on

research and education for Washington State. The proposed Water Resources Innovation Center would complement the existing center by using evidence-based approaches to transform WSU's abilities to address development challenges domestically and around the world. Establishment of a University Corps for International Development (the Corps) is a cornerstone of the Center. The Corps will enlist university students and faculty in challenges that leverage research and innovation to test and scale new models and approaches for maximizing development resources from sponsors. The trans-disciplinary Center will initially span colleges and departments at Washington State University, our regional and international partners. The Corps will focus on overcoming existing barriers in research and development placing both students and faculty initially here and abroad but with the intent to react to associated with strategic US initiatives. The Center's goals coincide with the US's need for development data and analysis, new models for development and for support in science and technology, and highly interdisciplinary approaches that connect expertise in areas of engineering, agriculture, health, business and socio-cultural dynamics as well as economics.

Third, WSU would benefit from more coordinated graduate education and training in water research. The Oregon State University Water Resources Graduate Program (<http://oregonstate.edu/gradwater/>); University of Idaho Waters of the West (<http://www.uidaho.edu/cogs/envs-wr/academics/water-resources/wow-integrated-basin-analyses>), Colorado State Water Resources and Management Program (<http://www.online.colostate.edu/topics-of-study/water/>) and other universities have integrated water resource management programs. A water-focused curriculum or set of programs at WSU would help focus student attention, recruitment, and retention of students interested in water resource management. Students in water-focused graduate programs would in turn help support faculty in productive research and education endeavors. Limited development of such an integrated water program could be done with relatively limited additional resources, but a more extensive integrated water curriculum would require additional teaching capacity.

Fourth, new hires are needed to complement and supplement the existing capacity in our water research community to allow WSU to capitalize on existing and future research opportunities and challenges. While there are myriad needs, some of the most pressing needs are in the areas of watershed and water resources processes, planning, and management; groundwater and vadose zone hydrology and conjunctive use; applied climatology and atmospheric dynamics; ecohydrology, ecological engineering, and green infrastructure; and water law, economics, and political science and international development; all with an emphasis on scientists with proven capacity for integrative thought and vision.

The interdependence of humans and our critical water resources in the context of the prospect of climate change that is already resulting in crucial vulnerabilities to societies globally and within our state, and call for renewed scientific vigor. Washington State University is poised to produce strong results from additional investments in water research. Water Research for Sustainability and Resilience is a Grand Challenge for WSU.

**RESEARCH INFRASTRUCTURE SUBCOMMITTEE  
DOCUMENTS**

RESEARCH INFRASTRUCTURE BINS  
WORKSHEET

CENTERS, INSTITUTES & LABORATORIES (CILS)

PROPOSED UNIVERSITY INFRASTRUCTURE  
COMMITTEE (UIC) STRUCTURE

FOCUSED INFRASTRUCTURE GROUPS  
STRUCTURE (FIG)

INFRASTRUCTURE ROLES DIAGRAM

SMALL INFRASTRUCTURE INVESTMENT  
PROGRAM (SIIP)

## WSU Faculty Senate Approved Centers, Institutes and Laboratories (CILs)

*updated November 2014*

Center, Institute or Laboratory (CIL)	Year Approved	Last Five- year Review	Next Five- year Review	Director(s)	Responsible Dean(s)
Animal Health Research Center	1993	2008	2015	Terry McElwain	Bryan Slinker
Biomolecular X-Rays Crystallography Center	2003	2014	2019	Chulhee Kang	Daryll DeWald
Center for the Study of Animal Well-Being	1993	2013	2018	Steve Simasko	Bryan Slinker/Ron Mittelhammer
Center for Behavioral Business Research	2010		2015	David Sprott	David Whidbee
Center for Digital Scholarship and Curation	2014		2019	Kim Withey/Trevor Bond	Daryll DeWald/Jay Starratt
Center for Environmental Research, Education and Outreach	2006	2011	2016	Stephanie Hampton	Chris Keane
Center for International Health Services, Research and Policy	2004	2009	2015	Joseph Coyne	Gary Pollack
Center for Materials Research	1993	2014	2019	Kelvin Lynn	Candis Claiborn/Daryll DeWald
Center for Non-Thermal Processing of Food	1997	2010	2015	Gustavo Barbosa-Canovas	Ron Mittelhammer
Center for Precision and Agricultural and Automated Systems	2000	2011	2016	Qin Zhang	Ron Mittelhammer
Center for Reproductive Biology	1997	2010	2015	Terry Hassold	Daryll DeWald
Center for Social and Environmental Justice	2008	2011	2015	Clay Mosher	Mel Netzhammer
Center for Transformational Learning and Leadership	2014		2019	Kim Kidwell	Ron Mittelhammer
Energy Systems Innovation Center	2012		2017	Cheng-Ching Liu	Candis Claiborn
Foley (Thomas S.) Institute for Public Policy and Service	2003	2014	2019	Cornell Clayton	Daryll DeWald
Franceschi Electron Microscopy and Image Center	1977	2011	2016	Michael Knoblauch	Daryll DeWald
Hoops Institute of Taxation Research and Policy	2010		2015	Susan Gill	David Whidbee
IMPACT Center	1983	2008	2015	Thomas Marsh	Ron Mittelhammer
Institute for the Study of Inter-Communal Conflict	2006	2011	2016	Martha Cottam	Daryll DeWald
Institute of Biological Chemistry	1980	2011	2017	John Browse	Ron Mittelhammer
Institute of Shock Physics	1992	2009	2015	Yogendra Gupta	Daryll DeWald
Intensive American Language Center	1984	2009	2015	Pamela Duran	Daryll DeWald ?
Interdisciplinary Design Institute	1994	2009	2015	Jolie Kaytes	Candis Claiborn/Ron Mittelhammer
International Business Institute	1997	2011	2016	David Sprott	David Whidbee
Laboratory for Atmospheric Research	1983	2014	2019	Brian Lamb	Candis Claiborn
Learning and Performance Research Center	2009		2015	Brian French	Michael Trevison
Marriott Foundation Hospitality Teaching Center	2011		2016	Nancy Swanger	David Whidbee
Monoclonal Antibody Center	1981	2012	2017	William Davis	Bryan Slinker
Murrow Center for Media and Health Promotion	2010		2015	Erica Austin	Larry Pintak
National Aquatics and Sports Medicine Institute	2008	2011	2016	Bruce Becker	Bill Moos



## WSU Faculty Senate Approved Centers, Institutes and Laboratories (CILs)

*updated November 2014*

Center, Institute or Laboratory (CIL)	Year Approved	Last Five- year Review	Next Five- year Review	Director(s)	Responsible Dean(s)
Nuclear Radiation Center	1977	2012	2017	Don Wall	Chris Keane
Pacific NW Mestizo and Indigenous Center for Research and	2013		2018	Brian McNeill/Lali McCubbin	Michael Trevison
Sleep and Performance Research Center	2008	2013	2018	Greg Belenky	Gary Pollack
Smart Environments Research Center	2014		2019	Diane Cook/Larry Holder	Candis Claiborn
Social and Economic Science Research Center	1970	2012	2017	Lena Le	Chris Keane
Translational Addiction Research Center	2011		2016	John Roll/Barbara Sorg	Bryan Slinker/Pat Butterfield
Washington Center for Muscle Biology ( <i>co-center with UW</i> )	2011		2016	Dan Rodgers	Ron Mittelhammer/Bryan Slinker
Washington State Institute for Criminal Justice	1994	2010	2015	Michael Gaffney	Daryll DeWald
Water Research Center	1965	2013	2018	Jonathan Yoder	Chris Keane

- Please describe the mentoring programs you have in place to prepare faculty to be competitive for prestigious national faculty awards.
- How does your institution promote your faculty research internationally? What metrics do you use to measure this effort?
- Please describe how you promote industry-related engagement at your institution.
- How does your institution transfer research discoveries out of the university?
- Please describe how the institution leverages the economic returns (royalties etc.) to further advance the research enterprise.

### **Institutional Research Office Responsible:**

#### Post Doc and RA/TA info:

- WSU counts overall and by college/dept. as needed. [\(Link to data\)](#)
- RA/TA counts overall and by source of funding. [\(Link to data\)](#)
- OSU grad assistant stipend report from OSU, and WSU data. Stipends are reported by type of assistantship (RA/TA); there is no detail for Masters vs. PhD students. [\(Click Here to Download OSU Data\)](#) [\(Click Here to Download WSU Data\)](#)

#### Students:

- Number of graduate students by program (including % minority, % women and % international). [\(Link to data\)](#)

#### Faculty data, T/TT measures:

- WSU and Peer (Legis and AAU Publics) information for Primarily Instructional, Primarily Research, and Instruction/Research/Public Service combined from IPEDS. [\(Click Here to Download OSU Data\)](#)
- Salaries--OSU faculty salary survey for WSU (spring 2014) and peers (as submitted for AY2013-14). Report is by discipline (department for WSU) and rank for full-time instructional faculty including buyouts for research. [\(Link to data\)](#)
- Historical Instructional Faculty Headcount and FTE by Rank (including Clinical). [\(Link to data\)](#)
- Academic Profiles – available on the [Institutional Research website](#)

#### Scholarly/creative productivity:

- T/TT numbers, Publication Count, Hirsch Index, NSF Facilities total research space, FY2008 to FY 2013 for AAU Publics. [\(Link to data\)](#)

*\*Tenure/Tenure Track is defined as faculty who were primarily instruction, primary research, and instruction combined with research/public service via IPEDS.*

## LIST OF INFRASTRUCTURE DATA SHEETS CONTAINED IN THIS SECTION

List of Bins (alphabetical)	Subgroup Assignment (leader is bolded)	comments
Analytical Chemistry (pg. 2)	<b>David Gang</b> , XXX	mass specs, NMR, other
Animal Resources (pg. 4)	<b>Steve Simasko</b> , Jon Oatley, Doug Call	vivaria, reproduction services, transgenic, behavior
Arts and Humanities (pg. 6)	<b>Jeff Savage</b> , XXX	
Computing & Cyberinfrastructure (pg. 7)	<b>Christian Mailhot</b> , Tori Byington	
Grant Support & Compliance (pg. 7)		Pre and post award support, support for compliance issues
Human Subjects: Equipment (pg. 8)	<b>Kenn Daratha</b>	
Imaging: Molecular & Biological (pg. 9)	<b>Steve Simasko</b> , Sue Clark	confocal, electron microscopes, whole animal imaging
Libraries & Databases (pg. 11)	<b>David Sprott</b> , Kenn Daratha	
Materials Research (pg. 12)	<b>Katie Zhong</b> , Christian Mailhot, Haluk Beyenal, Kelvin Lynn	
Molecular Biology/Biochemistry (pg. 14)	<b>Jon Oatley</b> , David Gang	sequencing, genotyping, FACS, laser dissecting microscopes, RIA
Nuclear Radiation Center (pg. 16)	<b>Sue Clark</b> , XXX	
Plant Resources (pg. 20)	<b>David Gang</b> , XXX	growth chambers,
Power Engineering (pg. 21)		
Regulatory and Compliance (pg. 21)	<b>Kenn Daratha</b>	
Social Sciences (pg. 21)	<b>David Sprott</b> , Kenn Daratha	
<b>Urban Campus Spreadsheets</b>	<i>WSU Spokane, WSU Tri-Cities, WSU Vancouver (pg. 22)</i>	
<b>College Spreadsheets</b>	<i>Listed alphabetically beginning on pg. 23</i>	
<b>New Infrastructure - Suggestions</b>	<i>list of policy suggestions and possible new infrastructure (pg. 26)</i>	

Bin:		Analytical Chemistry - Subgroup Members: Gang								
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues	
Mobile Atmospheric Chemistry Lab	Proton Transfer Reaction Mass Spectrometer; GC/MS Field instrument; Canister sampling/analysis by GC-FID/ECD; Infrared Gas Analyzer; Fast Olefin Sensor	MACL Trailer		CEE						
Mass Spec	Bruker Solarix MS imaging	VBRB	Gang	TBA		in progress				
Mass Spec	Thermo Fusion MS	VBRB	Gang	TBA		in progress				
Murdock Metabolomics Lab - sample prep	Retsch Mixer Mill MM 301; Zeiss/P.A.L.M. Laser dissecting micriscioe; GeneVac EZ-2 Solvent Extractor; Leica CM3050 S Cryostat	Clark Hall	Lange, Gang, Lewis	IBC						
Murdock Metabolomics Lab - imaging mass spec	Waters Maldi Synapt G2	Clark Hall	Lange, Gang, Lewis	IBC					inadequate staff support	
Murdock Metabolomics Lab - LC-MS	Waters Synaptic G2; Waters Xevo TQ Mass Spec; Thermo LCQ Advantage Ion Trap MS; Agilent 6200 Quadrapole TOF MS; Agilent Ion Trap MS; Agilent 1100 LC/MSD Single Quadrapole MS	Clark Hall	Lange, Gang, Lewis	IBC					inadequate staff support	
Murdock Metabolomics Lab - HPLC	Waters Acquity Ultra HPLC; Agilent 1290 Ultra HPLC; Agilent Rapid Resolution HPLC; Agilent Capillary Electrophoresis	Clark Hall	Lange, Gang, Lewis	IBC						

Bin: Analytical Chemistry - Subgroup Members: Gang									
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
Murdock Metabolomics Lab - GC-MS	Leco 4D GCxGC-TOF MA; Agilent 5973 GC-MSD; Agilent 6890 and 7890 GC-FID	Clark Hall	Lange, Gang, Lewis	IBC					
Analytical Chemistry Service Center				CAHNR S		Y			
Mass Spec	Waters XEVO G2-S QTOF/UPLC	Mass Spec Core Facility	Cheng	WSU Health Sciences					
Mass Spec/UFLC	AB Sciex Qtrap 6500 LC/MS/MS-Shimadzu Nexera UFLC	Mass Spec Core Facility	Cheng	WSU Health Sciences					
CRB Core Lab	Bruker HTC-Ion Trap; ABI MalDI-TOF/TOF	BLS	Munske/ Griswold	CRB Core Laboratory					
Mass Spec	HP 4500 ICP-MS system (inductively coupled plasma mass spectroscopy)		Christopher Gass	VCEA					
WSU Spokane NMR Core Facility	Bruker 500 MHz Advance II	WSU Spokane NMR Core Facility		WSU Health Sciences					
Center for Nuclear Magnetic Resonance	300 MHz Bruker/Varian NMR; 400 MHz Varian MR-400; 500 MHz Varian Inova; 400 MHz Bruker Avance DRX; 600 MHz Varian VNMRs; 40 KVA UPS; N <sub>2</sub> Generator	Fulmer Hall	Greg Helms	CAS					

Bin: Animal Resources – Subgroup Members: Simasko, Call, Oatley									
Instrument/ Facility	Specific Item	Location	Contact Person	Managed By	# Technical staff	(Y/N)	If yes, revenue (July 2012- June 2014)	~Size of user group	Comments/ Issues
<b>CVM facilities</b>									
VBRB vivarium	rodent (mice/rat)/zebra fish/frogs	VBRB Basement	Steve Simasko	IPN Service Center					
BLS vivarium	rodent (mice) housing	BLS Basement	Pat Hunt	SMB Service Center					
ARU vivarium	rodents, small ruminants	Bustad Hall/ADBF	Mike Malcolm	CVM Service Center					
Eastlick vivarium	rodent housing	Eastlick	Pat Hunt	SMB Service Center					some BL-3 space present
Wegner Vivarium	rodent housing/quarantine	Wegner Hall	Rebecca Craft, Steve Russell	Psychology					share with psychology
CVM - large animal	goat barn (200), large animal quarantine (141), incinerator (165D), pens/shelter (166, 167), track barn (169), isolation barns (160A & B), pastures, bighorn sheep pens		Mike Malcolm	CVM Service Center					
CVM - infectious disease	buildings 199(A-G) & 197L								
VCS	horse barn (120M&L), McCoy barns, McCoy dog housing/surgery, raptor facility, exotics ward (VTH), PATH horses at private facility								PATH horses should relocate to campus
WADDL	comprehensive animal and public health testing		Tim Baszler	WADDL					



<b>Bin:</b>		<b>Animal Resources – Subgroup Members: Simasko, Call, Oatley</b>							
<b>Instrument/ Facility</b>	<b>Specific Item</b>	<b>Location</b>	<b>Contact Person</b>	<b>Managed By</b>	<b># Technical staff</b>	<b>(Y/N)</b>	<b>If yes, revenue (July 2012- June 2014)</b>	<b>~Size of user group</b>	<b>Comments/ Issues</b>
<b>WSU Spokane</b>	Innovate vivarium, HSB310, PBS vivarium								
<b>WSU Vancouver</b>	rodent, bat, fish rooms								limited housing, no automated cleaning
<b>WSU Prosser</b>	mouse rooms								
<b>WSU Tri-cities</b>	fish room								
<b>WSU Puyallup</b>	poultry facility, fish facility, sheep pasture								
<b>Other Animal Resources</b>									
Transgenic Core	mouse transgenic services	BLS Basement	Hunt	CRB Core Laboratory					Underdevelopment, needs equipment
Animal Reproduction Core	reproduction services		Pru	CRB Core Laboratory					
Rodent Electrophysiological Suite			Kristen Anderson- Wing	Medical Sciences, Spokane					need for data storage and analysis
Veterinary Teaching Hospital	comprehensive clinical veterinary medical and surgical assessment, treatment and care	Veterinarian Teaching Hospital	Debra Sellon	CVM					

<b>Bin:</b>		<b>Arts and Humanities – Subgroup Members: Savage</b>							
<b>Instrument/ Facility</b>	<b>Specific Item</b>	<b>Location</b>	<b>Contact Person</b>	<b>Managed By</b>	<b># technical staff</b>	<b>(Y/N)</b>	<b>if yes, revenue (July 2012- June 2014)</b>	<b>~size of user group</b>	<b>Comments/ Issues</b>
<b>None reported</b>									



Bin:		Computing – Subgroup Members: Mailhoit, Byington, Daratha							
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012- June 2014)	~size of user group	Comments/ Issues
High Performance Computing Cluster		VCEA							
Computer		Kahn Lab	Mike Kahn			in progress			
Secure Data Repository			Cynthia Corbett	College of Nursing					Facility not present but needed
Campus Wide Computing			Mailhoit, Byington						Under investigation

Bin:		Grant Support & Compliance – Subgroup Member: needed							
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012- June 2014)	~size of user group	Comments /Issues
College of Education	Present are Budget/Finance Manager; Faculty Research Development Coordinator; Conference Coordinator	not indicated	Austin Church	COE					
Murrow College of Communication	access to biostatistician, grant writing assistance, medical writers		Bruce Pinkleton						
College of Nursing	pre and post award assistance		Cynthia Corbett						
College of Nursing	grant writing support		Cynthia Corbett						

Bin: Human Subjects: Equipment – Subgroup Members: Daratha									
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
Gait and Posture Lab	Motion Analysis Capture System; Delsys EMG system; forceplates, eye tracker	not indicated	Austin Church	COE					needs space
Exercise Physiology and Performance Lab	BodPod; ParvoMedics Metabolic cart	not indicated	Christopher Connolly	COE					Wingate Testing Equipment and Metabolic Rate Hood
Proposed: Neuroscience / Neuropsychology Lab		not indicated	Austin Church	COE					Equipment needs: Functional Near Infrared Spectroscopy, Electroencephalography, eye-tracking
Concussion and Sports Medicine Research Lab	BTE Multi-cervical Unit	not indicated	Austin Church	COE					Current equipment on loan
Focus Group Lab			Bruce Pinkleton	Murrow					Murrow Issues: equipment is dated and lack of space
Media Viewing lab			Bruce Pinkleton	Murrow					
Communication, emotion and cognition lab			Bruce Pinkleton	Murrow					
26-station computer lab			Bruce Pinkleton	Murrow					
Clinical Addiction Space				Nursing					
Specimen Repository				Nursing					not present but needed

Bin: Imaging: Molecular & Biological – Subgroup Members: Simasko, Clark									
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
<b>X-Ray Crystallography</b>									
Biomolecular X-ray Crystallography Center	X-ray generator and detector I and II, crystallization automation devises, two thermal titration calorimetry devices, MALS (Multi-angle light scattering devise	Fulmer 264	ChulHee Kang	CAS					lack of service contract, dated technology
<b>Electron Microscopes</b>									
Scanning Electron microscopes	Quanta 200F SEM, Hitachi S-570 SEM	Abelson	Knoblauch	Franceschi MIC					not equipped for elemental analysis; lacks 3 View (3D reconstruction)
Tranmission Electron microscopes	FEI Tecnai G2 20; Phillips CM-200	Abelson	Knoblauch	Franceschi MIC					not equipped with scanning tranmission detector and elemental analysis (EDX); lack of methods for elemental analysis; Phillips rig is dated
<b>Confocal Microscopes</b>									
Confocal microscope	Leica SP5 laser scanning	Clark Hall	Kirchoff	Franceschi MIC		Y			
Confocal microscope	Zeiss Meta LSM 510	FMIC	Knoblauch	Franceschi MIC		Y			dated instrument
Confocal microscope	Leica SP8 FLIM laser scanning	FMIC	Knoblauch	Franceschi MIC		Y			

Bin: Imaging: Molecular & Biological – Subgroup Members: Simasko, Clark									
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
Confocal microscope	Leica TCS SP5 two-photon	BLS	Shelden	Franceschi MIC		Y			
Confocal microscope	Leica TIRF	VBRB	Smertenko	Franceschi MIC		in progress			
Confocal microscope	Leica SP8 laser scanning	VBRB	Wayman	IPN Service Center		in progress			live cell optimized, need staff support
Confocal microscope	Leica SP8X laser scanning	VBRB	Wayman	IPN Service Center		in progress			live cell optimized, need staff support
Confocal microscope	Leica SD6000 AF spinning disk	VBRB	Wayman	IPN Service Center		in progress			live cell optimized, need staff support
Confocal microscope	Leica SP8	WSU Vancouver	Coffin						
Confocal microscope	Olympus FluoView 1000	WSU Spokane MIC	Chai	WSU Spokane Health Sciences					
Confocal microscope	Bruker Prairie In vivo 2-photon	WSU Spokane		College Medical Sci					
<b>Whole Animal Imaging</b>									
Whole Animal Imaging	Perkin-Elmer IVIS Spectrum CT	VBRB	Harding	IPN Service Center					
Whole Animal Imaging	Perkin-Elmer IVIS Spectrum CT	WSU Spokane							
DEXA	Hologic QDR4500A DEXA	Comparative Orthopedics	Martinez	CVM					

Bin:		Imaging: Molecular & Biological – Subgroup Members: Simasko, Clark							
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
		Research Lab (CVM)							
general imaging services	Radiography; C-Arm Digital Fluoroscopy; CT; MRI	Comparative Orthopedics Research Lab (CVM)	Martinez	CVM					
suggested needs (FMIC)	Atomic Force Microscope			FMIC					
	Fluorescent Dissecting Microscope			FMIC					
	Focused Ion Beam or dual beam Scanning Electron Microscope			FMIC					
	high pressure freezer			FMIC					
	Low end SEM (student training)			FMIC					
	critical point dryer			FMIC					

Bin:		Libraries & Database – Subgroup Members: Sprott, Daratha							
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments /Issues
College of Business	Wharton Research Data Services		David Sprott	College of Business					
College of Nursing	Data Sharing Agreements		Cynthia Corbett	College of Nursing					don't have but need

Bin:		Materials Research – Zhong, Mailhot, Beyenal, Lynn							
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
Analytical Catalysis Center	Confocal Raman Microscope additional confocal microscope; Atomic Force microscope; Inductively coupled plasma-mass spectrometer		Y Wang	VCEA					
Bioenergy & Catalysis Advanced Materials	X-ray Diffraction System			VCEA					
Bioenergy and Catalysis	Raman Spectroscopy (operando)			VCEA					expected in Murdoch application
Cleanroom	Sputtering deposition system; Etching System; Atomic Layer Deposition system			CMR					ALDS - expected Murdoch application
Laser Materials Lab				CMR					
Positron Lab		Webster		CMR					W.M. Keck Research Lab
Semiconductor Lab				CMR					
Solid State Detector Lab				CMR					
Thermal Fluids Lab				CMR					
Electron Microscopes	SEM with EDS and EBSD	ETRL		VCEA					
Rapid Prototyping Facility	Optomec Laser Engineered Net Shaping (LENS 750); ExOne 3D Printer (ceramics); Stratsys FDM TITAN; Stratasys FDM 1650	ETRL		W.M. Keck Biomaterials Lab					
Nano Powder Characterization Facility	TRISTAR 3000 BET surface analyzer; NICOMP 380 Particle size Analyzer	ETRL		W.M. Keck Biomaterials Lab					

Bin: Materials Research – Zhong, Mailhot, Beyenal, Lynn									
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
Thermal Analysis Facility	NETZSCH Thermal Analyzer (STA 409PC); Theta Dilatometer; NETSCH LFA 447 Nano Flash	ETRL		W.M. Keck Biomaterials Lab					
Porosity Measurement Facility	Micromeretics Mercury Porosimetry	???		W.M. Keck Biomaterials Lab					
Viscosity Analysis Facility	Haake PolyLab Torque Rheometer	ETRL		W.M. Keck Biomaterials Lab					
Ceramic Processing	Thermolyte High Temp Furnace; US Stoneware Ball Mill; Autoclave Engineers Cold Isotatic Press	ETRL		W.M. Keck Biomaterials Lab					
Microwave Sintering	3 KW Automatic Control Microwave Furnace	ETRL		W.M. Keck Biomaterials Lab					
Piezo Electric Characterization Facilities	Agilent Impedance Analyzer; Sensor Tech d33 Meter; Radiant Technologies Precision Workstation	ETRL		W.M. Keck Biomaterials Lab					
Thin Film Fabrication Facilities	Anoditation Setup; Gas Sensing Set Up	DANA		W.M. Keck Biomaterials Lab					
Mechanical Characterization	Table Top Universal Testing machine; Hardness tester; Tribometer			W.M. Keck Biomaterials Lab					
In Vitro Cell Culture Facility	Sterile hood; dual chamber incubator; Thermo Nicolet 67700 FTIR Spectrometer; Inverted microscope; microplate reader			W.M. Keck Biomaterials Lab					

Bin:		Materials Research – Zhong, Mailhot, Beyenal, Lynn								
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues	
Surface Characterization Facility	VCA Optima, AST Products			W.M. Keck Biomaterials Lab						
Elemental Characterization Facility	Atomic Absorption Spectroscopy Shimadzu AA-6800			W.M. Keck Biomaterials Lab						
Composite Manufacturing				CMEC						
Analytical Lab				CMEC						
Materials and Structural Testing Lab				CMEC						
Advanced Materials	Deformation testing			???						
WACXIT	X-ray & Imaging Technology			CEE						

Bin:		Molecular Biology/Biochemistry – Subgroup Members: Oatley, Gang								
Instrument / Facility	Specific Item(s)	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments / Issues	
sequencing	ABI 3730 DNA Analyzer; 454 Life Sciences; Ion Torrent PGM Sequencer; Nanodrop ND1000; two ABI 7500 RT-PCR	BLS	Griswold	CRB Core Laboratory						
microarray	Affymetrix GeneChip	BLS	Pouchnik/ Griswold	CRB Core Laboratory						



Bin: Molecular Biology/Biochemistry – Subgroup Members: Oatley, Gang									
Instrument/ Facility	Specific Item(s)	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012- June 2014)	~size of user group	Comments / Issues
Lab on a Chip	Agilent 2100 Bioanalyzer	BLS	Griswold	CRB Core Laboratory					
WSU Spokane Functional Genomics Core	Illumina HiSeq 2500 with C-bot; Illumina NextSeq 500; Beckman Biomek FXP workstation; Thermo 2000 Nanodrop; QuantStudio 7K Flex rtPCR; Spectromax M2; Agilent 2100 Bioanalyzer; Qiagen TissueLyzer II; Covaris M220	WSU Spokane Functional Genomics Core		WSU Spokane Health Sciences					
fluorescent activated cell sorting FACS	SONY SH800 and SONY SY3200	VBRB	Jon Oatley						
fluorescent activated cell sorting FACS		Bustad Hall	Davis	service center					
Flow Cytometry Core	Bio-Rad 3 sorter; BD Accuri C6 flow cytometer; Beckman Coulter Counter Gallios 6	Spokane Flow Cytometry Core		WSU Spokane					
laser dissecting microscope		Clark Hall	Lewis	service center		Y			inadequate staff support
laser dissecting microscope		VBRB	Spencer	service center		Y			
RIA Assay Core		VBRB	Pru	CRB Core Laboratory		Y			
Cellular Metabolism	Seahorse XFe96 Extracellular Flux Analyzer		Kristen Anderson- Wing	WSU Spokane - CMS					Technology outdated in ~3 years
General Biochemistry Lab	various	4th Floor Nursing Building	Cynthia Corbett	College of Nursing					

Bin: Nuclear Radiation Center – Subgroup Members: Clark											
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	Critical limitations	Technical Staffing and Licensing	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
TRIGA reactor	General Atomics TRIGA	Room 201	Donald Wall	Nuclear Radiation Center	Operations require U.S. NRC licensed individuals. Licensing from time of new hire takes 6 - 9 months.	Operations require U.S. NRC licensed individuals. Licensing from time of new hire takes 6 - 9 months.					
Gamma Irradiator	400 Ci Co-60	Room 201	Donald Wall	Nuclear Radiation Center	Restricted access. Must be escorted by a U.S. Nuclear Regulatory Commission licensed individual.	Operations require U.S. NRC licensed individuals. Licensing from time of new hire takes 6 - 9 months.					
auto gamma counter	Packard Cobra II	Room 215	Donald Wall	Nuclear Radiation Center	Training required before use.						
Liquid Scintillation Counter	Beckman LS 6500	Room 215	Donald Wall	Nuclear Radiation Center	Training required before use.						
UV-Vis Spectroscopy	Varian Cary 50	Room 215	Donald Wall	Nuclear Radiation Center	Training required before use.						
Gas proportional counter	NML Prop Model PC-6	Room 215	Donald Wall	Nuclear Radiation Center	Training required before use.						
Gamma Spectroscopy	Canberra GC4018	Room 215	Donald Wall	Nuclear Radiation Center	Training required before use.						

Bin: Nuclear Radiation Center – Subgroup Members: Clark											
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	Critical limitations	Technical Staffing and Licensing	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
alpha spectroscopy	EG&G Ortec	Room 215	Donald Wall	Nuclear Radiation Center	Training required before use.						
Gamma Spectroscopy	Canberra 970/C	Room 116	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Spectroscopy	Canberra GC9020	Room 116	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Spectroscopy	Ortec GEM	Room 116	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Spectroscopy	Canberra GC 2020	Room 116	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Spectroscopy	Princeton Gamma Tech IG1010	Room 116	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
alpha spectroscopy	EG&G Ortec Octete PC	Room 116	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear						

Bin: Nuclear Radiation Center – Subgroup Members: Clark											
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	Critical limitations	Technical Staffing and Licensing	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
					Radiation Center						
ICP MS	Hewlett Packard 4500	Room 114	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
XRD	Bruker Smart Apex II	Room 114	Donald Wall	Nuclear Radiation Center	Operation of this equipment takes specialized training. At this time there is no one						
Liquid Scintillation Counter	Tricarb 2900 TR	Room 110	Scott Finch	Radiation Safety Office							
LSC	Tricarb 2910 TR	Room 110	Scott Finch	Radiation Safety Office							
Unilab Glovebox	Mbraun controlled atmosphere	Room 101	Donald Wall	Nuclear Radiation Center	Use restricted to faculty, post-docs, advanced graduate students,						
ITC	Isothermal Titration Calorimeter	Room 101	Donald Wall	Nuclear Radiation Center	Use restricted to faculty, post-docs, advanced graduate students,						

Bin: Nuclear Radiation Center – Subgroup Members: Clark											
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	Critical limitations	Technical Staffing and Licensing	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
UV-Vis Spectroscopy	OTIS Cary 14	Room 101	Donald Wall	Nuclear Radiation Center	Use restricted to faculty, post-docs, advanced graduate students,						
Neutron Irradiation	Epithermal neutron beam	Room 2	Donald Wall	Nuclear Radiation Center	Restricted access. Must be escorted by a U.S. Nuclear Regulatory Commission licensed individual.	Operations require U.S. NRC licensed individuals. Licensing from time of new hire takes 6 - 9 months.					
Gamma Spectroscopy	Ortec GEM 35190-P	Basement	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Spectroscopy	EG&G Ortec 659	Basement	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Spectroscopy	EG&G Ortec 659	Basement	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear Radiation Center						
Gamma Irradiator	JLSheperd 142-S, 600	Sub basement	Donald Wall	Nuclear Radiation Center	Use restricted to employees of the Nuclear						

Bin:		Nuclear Radiation Center – Subgroup Members: Clark									
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	Critical limitations	Technical Staffing and Licensing	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments/ Issues
	mCi of Cs-137				Radiation Center						
Milling machine	Bridgeport	Machine Shop	Donald Wall	Nuclear Radiation Center	Training required before use.						
Lathe	Cincinnati	Machine Shop	Donald Wall	Nuclear Radiation Center	Training required before use.						
welding	Linde C-300 amp	Machine Shop	Donald Wall	Nuclear Radiation Center	Training required before use.						

Bin:		Plant Resources									
Instrument / Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012-June 2014)	~size of user group	Comments /Issues		
Plant growth facility	green houses/ growth chambers		Dreesman, Kahn, Hetrick, Browse	CAHNRS Service Center							
Plant transformation facility	Plant transformation facility	Vogel	Dhinga	CAHNRS Service Center					equipment does not meet standards, inadequate staff support		
Double haploid laboratory	Double haploid laboratory	Johnson Hall	Harsh	CAHNRS Service Center					inadequate staff support		

Bin:		Power Engineering – Subgroup Members: needed							
Instrument/ Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012- June 2014)	~size of user group	Comments/ Issues
Energy Systems Innovation Center									

Bin:		Human Subjects: Regulatory & Compliance – Subgroup: Daratha							
Instrument t/Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012- June 2014)	~size of user group	Comments / Issues
Access to Clinical Populations				Nursing					need to negotiate agreements
Data Sharing agreements				Nursing					need to negotiate agreements
Clinical Trials Support				Nursing					in need of staff support, need individuals with advanced degrees
Secure Data Repository				Nursing					special security for clinical data

Bin:		Social Sciences – Subgroup Members: Sprott							
Instrument /Facility	Specific Item	Location	Contact Person	Managed By	# technical staff	(Y/N)	if yes, revenue (July 2012- June 2014)	~size of user group	Comments / Issues
Center for Behavioral Business Research	computer lab/cameras	Todd Hall	Mauricio Featherman	CCB					
Financial Markets Lab			David Sprott	CCB					
Data access/management	Data collection software (Qualtrics, Inquist); Wharton Research Data Services (WRDS)		David Sprott	CCB					staffing and costs associated with subscriptions
Hospitality Training Center			David Sprott	CCB					
Computer Labs and support			David Sprott	CCB					

<b>WSU Spokane</b>		
<b>Item / category</b>	<b>College</b>	<b>Location on 'bin' spreadsheet</b>
WSU Spokane NMR Core Facility	Pharmacy	Analytical Chemistry
WSU Spokane Functional Genomics Core	Pharmacy	Molecular Biology/Biochemistry
WSU Spokane Microscopy Imaging Core	Pharmacy	Imaging: Molecular & Biological
Flow Cytometry Core	Pharmacy	Molecular Biology/Biochemistry
Whole Animal Imaging	Pharmacy	Imaging: Molecular & Biological
Mass Spec Core Facility	Pharmacy	Analytical Chemistry
Rodent Electrophysiological Suite	Medical Sciences	Animal Resources
Cellular Metabolic Analysis	Medical Sciences	Molecular Biology/Biochemistry
Confocal Microscope	Medical Sciences	Imaging: Biological
General Lab Equipment	Nursing	Molecular Biology/Biochemistry
Clinical Space - Addiction Research	Nursing	Human Subjects: Equipment
Access to Clinical Populations	Nursing	Human Subjects: Regulatory and Compliance
Data Sharing Agreements	Nursing	Human Subjects: Regulatory and Compliance; Libraries and Databases
Research Methodology Support	Nursing	Grant Support and Compliance
Clinical Trials Support	Nursing	Human Subjects: Regulatory and Compliance
Secure Data Repository	Nursing	Computing; Human Subjects: Regulatory and Compliance
Specimen Repository	Nursing	Human Subjects: Equipment
Grant Writing Support	Nursing	Grant Support and Compliance

<b>WSU TriCities</b>		
<b>Item / category</b>	<b>College</b>	<b>Location on 'bin' spreadsheet</b>
n/a		

<b>WSU Vancouver</b>		
<b>Item / category</b>	<b>College</b>	<b>Location on 'bin' spreadsheet</b>
Confocal microscope: Leica SP8		Imaging: Molecular and Biological



<b>Agriculture, Human, and Natural Resource Sciences (CAHNRS)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Confocal microscopes	Imaging: Molecular & Biological
Mass Spectrophotometers	Analytical Chemistry
HPLC, GC Instruments	Analytical Chemistry
Analytical Chemistry Service Center	Analytical Chemistry
Laser dissecting microscopes	Molecular Biology/Biochemistry
mobile fluorescence camera	Plant Resources
advanced computer	Computing
double haploid laboratory	Plant Resources
plant transformation facility	Plant Resources
greenhouses and growth chambers	Plant Resources
various small animal vivaria	Animal Resources
RIA Core Lab	Molecular Biology/Biochemistry
<b>Arts and Sciences (CAS)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Biomolecular X-ray Crystallography Center	Imaging
Scanning EM: Quanta 200F SEM, Hitachi S-570 SEM	Imaging
Transmission EM: FEI Tecnai G2 20; Phillips CM-200	Imaging
Confocal: Leica SP5 laser scanning	Imaging
Confocal: Zeiss Meta LSM 510	Imaging
Confocal: Leica SP8 FLIM laser scanning	Imaging
Confocal: Leica TCS SP5 two-photon	Imaging
Confocal: Leica TIRF	Imaging
Positron Beam	Materials Research
Accelerator and Positron Beam	Materials Research
Vibrometer Modul Controller	Materials Research
Magnet	Materials Research
<b>Business (CCB)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Center for Behavioral Business Research	Social Sciences
Financial Markets Lab	Social Sciences
Data access/management	Social Sciences; Libraries and Databases
Hospitality Training Center	Social Sciences
Computer Labs and support	Social Sciences

<b>Communication (MCC)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Focus Group Lab	Human Subjects: Equipment
Media Viewing lab	Human Subjects: Equipment
Communication, emotion and cognition lab	Human Subjects: Equipment
26-station computer lab	Human Subjects: Equipment
Grant Support	Grant Support
<b>Education (COE)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Motion Analysis Equipment	Human Subjects: Equipment
BodPod	Human Subjects: Equipment
BTE Multi-cervical unit	Human Subjects: Equipment
<b>Engineering and Architecture (VCEA)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Mobile Atmospheric Chemistry Lab	Analytical Chemistry
Analytical Catalysis Center	Materials Research
Bioenergy & Catalysis Advanced Materials	Materials Research
Bioenergy and Catalysis	Materials Research
Cleanroom	Materials Research
Laser Materials Lab	Materials Research
Positron Lab	Materials Research
Semiconductor Lab	Materials Research
Solid State Detector Lab	Materials Research
Thermal Fluids Lab	Materials Research
Electron Microscopes	Materials Research
Rapid Prototyping Facility	Materials Research
Nano Powder Characterization Facility	Materials Research
Thermal Analysis Facility	Materials Research
Porosity Measurement Facility	Materials Research
Viscosity Analysis Facility	Materials Research
Ceramic Processing	Materials Research
Microwave Sintering	Materials Research
Piezo Electric Characterization Facilities	Materials Research
Thin Film Fabrication Facilities	Materials Research
Mechanical Characterization	Materials Research
In Vitro Cell Culture Facility	Materials Research

Surface Characterization Facility	Materials Research
Elemental Characterization Facility	Materials Research
Composite Manufacturing	Materials Research
Analytical Lab	Materials Research
Materials and Structural Testing Lab	Materials Research
Advanced Materials	Materials Research
WACXIT	Materials Research
<b>Honors</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
None reported	
<b>Medical Sciences (CMS)</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
Rodent Electrophysiological Suite	Animal Resources
Cellular Metabolic Analysis	Molecular Biology/Biochemistry
Confocal Microscope	Imaging: Molecular & Biological
<b>Nursing</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
General Lab Equipment	Biochemistry General
Clinical Space - Addiction Research	Human Subjects: Equipment
Access to Clinical Populations	Human Subjects: Regulatory and Compliance
Data Sharing Agreements	Human Subjects: Regulatory and Compliance; Libraries and Databases
Research Methodology Support	Grant Support and Compliance
Clinical Trials Support	Human Subjects: Regulatory and Compliance
Secure Data Repository	Computing; Human Subjects: Regulatory and Compliance
Specimen Repository	Human Subjects: Equipment
Grant Writing Support	Grant Support and Compliance
<b>Pharmacy</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
WSU Spokane NMR Core Facility	Analytical Chemistry
WSU Spokane Functional Genomics Core	Molecular Biology-Biochemistry
WSU Spokane Microscopy Imaging Core	Imaging: Molecular & Biological
Flow Cytometry Core	Molecular Biology - Biochemistry
Whole Animal Imaging	Imaging: Molecular & Biological
Mass Spec Core Facility	Analytical Chemistry

<b>Veterinary Medicine</b>	
<b>Item / category</b>	<b>Location on 'bin' spreadsheet</b>
small and large animal vivariums	Animal Resources
Veterinary Teaching Hospital	Animal Resources
WADDL	Animal Resources
Cell Sorting	Molecular Biology/Biochemistry
Sequencing	Molecular Biology/Biochemistry
Confocal Microscopes	Biological: Imaging
DEXA	Imaging: Molecular & Biological
general imaging services	Imaging: Molecular & Biological
microarray	Molecular Biology/Biochemistry
Lab on a Chip	Molecular Biology/Biochemistry

<b>Suggested New Infrastructure</b>		
<b>Item / Facility</b>	<b>Suggested by</b>	<b>Comments</b>
Center for Cryogenic Engineering and Safety	VCEA - Christopher Gass	helium recycling
Computing Infrastructure	ARC, CCB	big data" , data set storage
Better Staff support for imaging	FMIC, IPN	
Better Staff support for proteomics	ARC,	
next gen sequencing	SMB	
live cell imaging	SMB	
Upgrades to wine center, financial markets lab	CCB-Sprott	~cost \$2 million
Bioinformatics support	CVM	
source of funds for maintenance costs	various	
source of funds for small equipment support	various	

## WSU Faculty Senate Approved Centers, Institutes and Laboratories (CILs)

*updated November 2014*

Center, Institute or Laboratory (CIL)	Year Approved	Last Five- year Review	Next Five- year Review	Director(s)	Responsible Dean(s)
Animal Health Research Center	1993	2008	2015	Terry McElwain	Bryan Slinker
Biomolecular X-Rays Crystallography Center	2003	2014	2019	Chulhee Kang	Daryll DeWald
Center for the Study of Animal Well-Being	1993	2013	2018	Steve Simasko	Bryan Slinker/Ron Mittelhammer
Center for Behavioral Business Research	2010		2015	David Sprott	David Whidbee
Center for Digital Scholarship and Curation	2014		2019	Kim Withey/Trevor Bond	Daryll DeWald/Jay Starratt
Center for Environmental Research, Education and Outreach	2006	2011	2016	Stephanie Hampton	Chris Keane
Center for International Health Services, Research and Policy	2004	2009	2015	Joseph Coyne	Gary Pollack
Center for Materials Research	1993	2014	2019	Kelvin Lynn	Candis Claiborn/Daryll DeWald
Center for Non-Thermal Processing of Food	1997	2010	2015	Gustavo Barbosa-Canovas	Ron Mittelhammer
Center for Precision and Agricultural and Automated Systems	2000	2011	2016	Qin Zhang	Ron Mittelhammer
Center for Reproductive Biology	1997	2010	2015	Terry Hassold	Daryll DeWald
Center for Social and Environmental Justice	2008	2011	2015	Clay Mosher	Mel Netzhammer
Center for Transformational Learning and Leadership	2014		2019	Kim Kidwell	Ron Mittelhammer
Energy Systems Innovation Center	2012		2017	Cheng-Ching Liu	Candis Claiborn
Foley (Thomas S.) Institute for Public Policy and Service	2003	2014	2019	Cornell Clayton	Daryll DeWald
Franceschi Electron Microscopy and Image Center	1977	2011	2016	Michael Knoblauch	Daryll DeWald
Hoops Institute of Taxation Research and Policy	2010		2015	Susan Gill	David Whidbee
IMPACT Center	1983	2008	2015	Thomas Marsh	Ron Mittelhammer
Institute for the Study of Inter-Communal Conflict	2006	2011	2016	Martha Cottam	Daryll DeWald
Institute of Biological Chemistry	1980	2011	2017	John Browse	Ron Mittelhammer
Institute of Shock Physics	1992	2009	2015	Yogendra Gupta	Daryll DeWald
Intensive American Language Center	1984	2009	2015	Pamela Duran	Daryll DeWald ?
Interdisciplinary Design Institute	1994	2009	2015	Jolie Kaytes	Candis Claiborn/Ron Mittelhammer
International Business Institute	1997	2011	2016	David Sprott	David Whidbee
Laboratory for Atmospheric Research	1983	2014	2019	Brian Lamb	Candis Claiborn
Learning and Performance Research Center	2009		2015	Brian French	Michael Trevison
Marriott Foundation Hospitality Teaching Center	2011		2016	Nancy Swanger	David Whidbee
Monoclonal Antibody Center	1981	2012	2017	William Davis	Bryan Slinker
Murrow Center for Media and Health Promotion	2010		2015	Erica Austin	Larry Pintak
National Aquatics and Sports Medicine Institute	2008	2011	2016	Bruce Becker	Bill Moos

## WSU Faculty Senate Approved Centers, Institutes and Laboratories (CILs)

*updated November 2014*

Center, Institute or Laboratory (CIL)	Year Approved	Last Five- year Review	Next Five- year Review	Director(s)	Responsible Dean(s)
Nuclear Radiation Center	1977	2012	2017	Don Wall	Chris Keane
Pacific NW Mestizo and Indigenous Center for Research and	2013		2018	Brian McNeill/Lali McCubbin	Michael Trevison
Sleep and Performance Research Center	2008	2013	2018	Greg Belenky	Gary Pollack
Smart Environments Research Center	2014		2019	Diane Cook/Larry Holder	Candis Claiborn
Social and Economic Science Research Center	1970	2012	2017	Lena Le	Chris Keane
Translational Addiction Research Center	2011		2016	John Roll/Barbara Sorg	Bryan Slinker/Pat Butterfield
Washington Center for Muscle Biology ( <i>co-center with UW</i> )	2011		2016	Dan Rodgers	Ron Mittelhammer/Bryan Slinker
Washington State Institute for Criminal Justice	1994	2010	2015	Michael Gaffney	Daryll DeWald
Water Research Center	1965	2013	2018	Jonathan Yoder	Chris Keane

## **RECOMMENDED STRUCTURE & RESPONSIBILITIES FOR UNIVERSITY INFRASTRUCTURE COMMITTEES**

### **Responsibilities and Structure of the UIC**

The standing UIC would have the following responsibilities:

1. Annual review of support for infrastructure personnel.
2. Evaluate major infrastructure proposals.
3. Administer the Small Infrastructure Investment Program (SIIP).
4. Evaluate and select internal MRI and Murdock type applications (i.e., those in which an internal competition must first select the one or two applications that WSU will submit to external agencies).
5. Investigate and recommend infrastructure additions when major capital projects (typically buildings) are programmed.

The structure of the UIC would be (see diagram on next page):

1. Made up of the chairs of the individual focused infrastructure groups.
2. Chair of the UIC is elected from the membership of the UIC
  - a. Responsible for setting meeting agendas.
  - b. Requires at least 1 year prior service on the UIC.

Recommended review criteria for proposals (major and minor):

1. Productivity of the unit making the request (e.g., funding associated with the particular item, publications, support for student theses, etc.). These would be matched to AAU metrics.
2. Fit of the infrastructure item to overall university strategic goals and/or grand challengers.
3. Number of investigators served.
4. Willingness of colleges and/or departments that are served by the infrastructure to cost share.
5. Evaluation whether the service can be provided externally for less cost.

Staff support for the UIC should be provided by the Office of the Vice President for Research. This support would provide three functions for the UIC:

1. Schedule meetings, take and distribute notes.
  2. Handle proposal documents: collate and distribute.
  3. Work with the chairs of the focused infrastructure groups ('Bin Committees') to maintain the Office of Research website that describes current infrastructure.
-

## **RECOMMENDED STRUCTURE & RESPONSIBILITIES FOR FOCUSED INFRASTRUCTURE GROUPS (FIG)**

### **FIG Membership:**

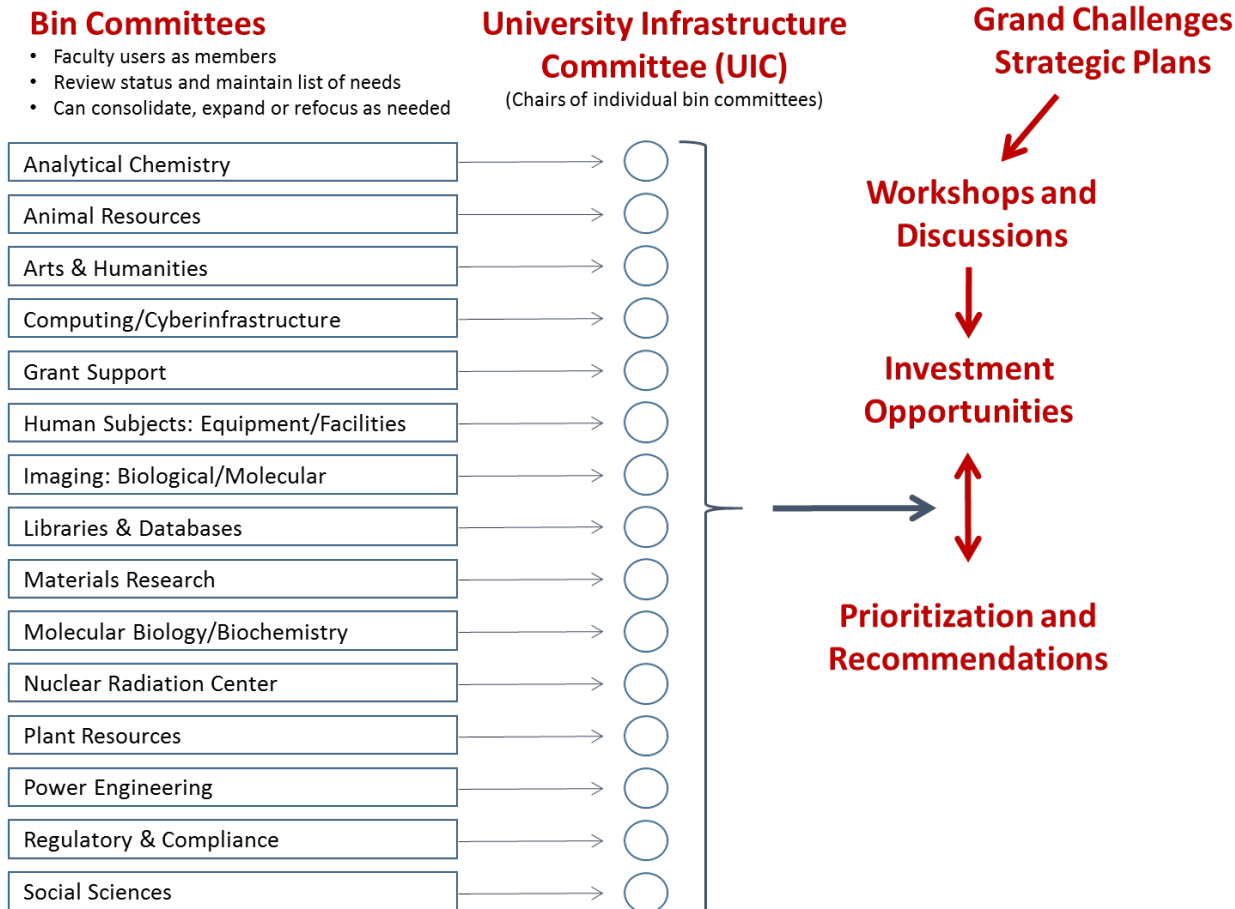
1. Faculty users as well as center directors are eligible (should be a mix of users and managers with a majority being users).
2. The committee should have a reasonable number of members (exact number depends on the nature of the infrastructure), and members should come from multiple units or colleges that are served by the infrastructure.
3. Multi-year fixed term appointments. Terms should also be staggered to avoid massive turnover. These requirements should ensure institutional memory but at the same time produce turnover of the committee so that multiple faculty users are involved.
4. Chair is elected from the membership (requires at least one year prior service to ensure the chair is knowledgeable about issues within the focused infrastructure group).
5. New members are selected by a committee that consists of the current chair of the focus group, the UIC Chair (or designee), and the VPR. Having two of the three members of the appointing committee outside the current committee ensures broad representation. Having the focused infrastructure group chair as part of the process ensures that people of the appropriate background are appointed to the committee.

### **Responsibilities:**

1. On an annual basis, review the current status of items within the focus group. If personnel are supported centrally, review and justify continued support for the personnel.
  2. Maintain an active, prioritized list of improvements to the infrastructure within the focus group.
  3. Serve as a technical review board for the UIC when major items are proposed that will create items that will be assigned to the focused infrastructure group.
  4. Set prioritization levels for small infrastructure investments that arise within the focus group.
-



## DIAGRAM OF INFRASTRUCTURE COMMITTEES ROLES & RESPONSIBILITIES



## SMALL INFRASTRUCTURE INVESTMENT PROGRAM (SIIP)

This program is to support smaller investments (<\$200,000 in total costs, this limit could be set lower) that support general university research infrastructure. The item could be a unique new item, an addition to an existing item/cluster, or to repair an existing item.

- The allocation for the SIIP program is made by the VP for Research.
  - There is a quarterly call for proposals. A quarterly call ensures that timely decisions could be made when needed.
  - Proposals are entertained only if the specific unit making the request is part of the general university research/scholarly/creative infrastructure. This is demonstrated by the specific unit/cluster making the request is part of the items/clusters listed within one of the focused infrastructure groups. It should be noted that the intent of the program is not to support departmental or individual investigators who are in need of upgrading their personal items, but to maintain university infrastructure. This line is sometimes difficult to draw, but since how well the item supports general university research/scholarly/creative mission is part of the evaluation criteria, rather than be prescriptive from the start, each request would have to be justified as to how it meets some broad university mission and ultimately judged against other requests.
  - Although proposals would typically be started by a small group of faculty users who identify a problem or opportunity, proposals should be coordinated and guided through the appropriate focused infrastructure group. The focused infrastructure group is responsible for ranking multiple proposals that arise from their focus, and should further write a statement to the UIC that justifies the request in the context of the needs of the focused infrastructure group. Thus while the UIC will have members relatively unknowledgeable about specific items, yet required to judge proposals, the UIC membership would be able to rely on the focused infrastructure group (with detailed knowledge) to provide the justification for the request. The purpose of the UIC would be to evaluate the proposal relative to broader University goals and needs.
  - Funds can be request for the purpose of internal matches for external proposals. However, funds are only awarded if the external proposal is funded.
  - The criteria for evaluated proposals are the same as those described for major proposals (see above).
  - Staff support for the SIIP program should be provided by the Office of the Vice President for Research.
-

## **APPENDIX I**

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# **FACULTY & STUDENT RECRUITMENT, ENGAGEMENT & PRODUCTIVITY & OUTREACH, ENGAGEMENT & ECONOMIC DEVELOPMENT**

## **SUBCOMMITTEE DOCUMENTS**

FSREP & OEDD DATA

LIST OF NRC (AAU) RECOGNIZED PRESTIGIOUS  
AWARDS

WSU PRESTIGIOUS AWARD WINNERS

OSU FACULTY SALARY PEER COMPARISON  
(2014)

WSU FOUNDATION REPORT

## Faculty and Student Engagement/Productivity Subcommittee Data

### Faculty and Student Engagement/Productivity subgroup:

- Information Requested from WORQS
  - For the year 2013, 1,820 people filed WORQS reports. In 2008, 2,073 filed reports. This counts both faculty and AP.  
Approx. 92-95% of the faculty file. The College of Business does not file; they have another system.  
Of the AP, approx. 22-25% file.

Here is the count of faculty vs AP by year, note the comment below.

Report year	Faculty Count	Non faculty Count
2008	1534	539
2009	1516	497
2010	1456	460
2011	1503	416
2012	1543	384
2013	1521	299

*These are very close estimate. All of the year count are based on what type of employee is at this time, not in 2008 or 2009. There may not be that many that went from one type to another, e.g. ap to faculty, or adjunct to faculty.*

- Number of grant proposals submitted (total and per T/TT\*)
  - Data Collected via MyResearch:

State FY	Number of Proposals	T/TT Counts	Proposals per T/TT
2009	2,272	946	2.40
2010	2,316	937	2.47
2011	2,480	919	2.70
2012	2,617	924	2.83
2013	2,586	924	2.80

- Number of grant awards received (total and per T/TT)
  - Data Collected via My Research:

State FY	Number of Awards	T/TT Counts	Awards per T/TT
2009	1,717	946	1.82
2010	1,784	937	1.90
2011	1,851	919	2.01
2012	1,830	924	1.98
2013	1,702	924	1.84

- Number of large (>\$5M) multi-faculty proposals (such as program projects) submitted and awarded

- Data collected via MyResearch

State FY	Number of Large Multi-Faculty Proposals
2010	5
2011	11
2012	9
2013	2
2014	10
2010	5

State FY	Number of Large Multi-Faculty Awards
2010	2
2011	2
2012	1
2013	1
2014	0
2010	2

- Number of trainee support ('T32' type) applications submitted and awarded

- Data collected via MyResearch

State FY	Number of IGERT/NRT Pre-Proposals	Number of IGERT/NRT New/Ren/Resub Proposals	Number of GAANN New/Ren/Resub Proposals	Number of T32 New/Ren/Resub Proposals	Totals
2010	2	0	0	0	2
2011	1	0	0	0	1
2012	1	1	3	0	5
2013	0	1	0	1	2
2014	1	2	0	1	4

State FY	Number of IGERT/NRT New/Ren/Resub Awards	Number of GAANN New/Ren/Resub Awards	Number of T32 New/Ren/Resub Awards	Totals
2010	2	1	2	5
2011	0	0	0	0
2012	0	0	0	0
2013	0	1	0	1
2014	0	0	1	1

- Proposal Success Rates (NSF and NIH)
  - Data Collected via MyResearch

	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>
<b>NSF - New only</b>	40/227 - 18%	51/246 - 21%	38/232 - 16%	49/268 - 18%	39/224 - 17%
<b>NSF - New, Renewal, Resubmission and Supplement</b>	68/273 - 25%	88/314 - 28%	68/287 - 24%	83/314 - 26%	69/277 - 25%
<b>NIH - New only</b>	16/89 - 18%	16/120 - 13%	19/141 - 13%	11/116 - 9%	7/124 - 6%
<b>NIH - New, Renewal, Resubmission and Supplement</b>	34/132 - 26%	45/179 - 25%	37/195 - 19%	32/164 - 20%	33/167 - 20%

- F&A Expenditure amounts (still to be obtained via MyResearch)
- F&A Reallocation Models (still to be obtained)
- Job placement information (data available from OGRD)
- Percentage of Tenure/Tenure Track faculty at WSU on sabbatical per year, relative to peers (still to be obtained).

For further information, and more detailed data, please contact WSU's Office of Grants & Research Development (OGRD).

**Awards in the Arts and Humanities**

HIGHLY PRESTIGIOUS

\* data not available

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>American Studies</b>	1 Bode-Pearson Prize for Outstanding Contributions to American Studies	American Studies Association
	2 Constance M. Rourke Prize	American Studies Association
<b>Classics</b>	1 Charles J. Goodwin Award of Merit	American Philological Association
	2 National Endowment for the Humanities Fellowships	American School of Classical Studies at Athens
<b>Comparative Literature</b>	1 Harry Levin Prize	American Comparative Literature Association
	2 René Wellek Prize	American Comparative Literature Association
<b>English Language and Literature</b>	1 Emerson-Thoreau Medal	American Academy of Arts and Sciences
	2 MLA Award for Lifetime Scholarly Achievement	Modern Language Association
	3 William Riley Parker Prize	Modern Language Association
	4 James Russell Lowell Prize	Modern Language Association
	5 Jay Hubbell Medal for Lifetime Achievement in Advancing American Literature Study	Modern Language Association
	6 National Book Award	National Book Foundation
	7 National Book Critics Circle Award*	National Book Critics Circle*
	8 Nobel Prize in Literature	Swedish Academy
	9 Pen-Faulkner Award for Fiction	Pen-Faulkner Foundation
	10 Pulitzer Prize	The Pulitzer Board
	11 Ruth Lilly Poetry Prize	Poetry Foundation
	12 Whiting Writers' Award	Whiting Foundation
<b>History</b>	1 Talcott Parsons Prize	American Academy of Arts and Sciences
	2 Mellon Distinguished Scholar	American Antiquarian Society
	3 AAS-National Endowment for the Humanities Fellowships	American Antiquarian Society
	4 The Albert J. Beveridge Award for history of the United States, Latin America, or Canada since 1492 (Book Prize)	American Historical Association
	5 The John K. Fairbank Prize for East Asian history since 1800 (Book Prize)	American Historical Association
	6 The Awards for Scholarly Distinction to senior historians for lifetime achievement.	American Historical Association
	7 Merle Curti Award	Organization of American Historians
	8 Frederick Jackson Turner Award	Organization of American Historians
	9 Lifetime Achievement Award	American Association for the History of Medicine
	10 Sarton Medal for lifetime scholarly achievement	History of Science Society
	11 Haskins Medal for a distinguished book	Medieval Academy of America
	12 Paul Oskar Kristeller Lifetime Achievement Award	Renaissance Society of America
	13 Bancroft Award	Trustees of Columbia University
	14 Parkman Prize	Society of American Historians
<b>History of Art, Architecture, and Archaeology</b>	1 Gold Medal Award for Distinguished Archaeological Achievement	Archaeological Institute of America

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Music (except performance)</b>	1	Grawemeyer Award for Music Composition	Grawemeyer Foundation
<b>Religion</b>	1	Grawemeyer Award for Religion	Grawemeyer Foundation
	2	Templeton Prize	John Templeton Foundation
<b>Theatre and Performance Studies</b>	1	Distinguished Scholar Award	American Society for Theatre Research
	2	Barnard Hewitt Award	American Society for Theatre Research
	3	George Jean Nathan Award for Dramatic Criticism	Department of English, Cornell University
<b>Multidisciplinary</b>	1	American Academy of Arts and Sciences Members	American Academy of Arts and Sciences
	2	ACLS Fellowships	American Council of Learned Societies
	3	ACLS Mellon Fellowships	American Council of Learned Societies
	4	Benjamin Franklin Medal for Distinguished Achievement in the Humanities or Sciences	American Philosophical Society
	5	Thomas Jefferson Medal for Distinguished Achievement in the Arts, Humanities, or Social Sciences	American Philosophical Society
	6	John Frederick Lewis Award	American Philosophical Society
	7	Henry Allen Moe Prize in the Humanities	American Philosophical Society
	8	Jacques Barzun Prize in Cultural History	American Philosophical Society
	9	Guggenheim Fellow	John Simon Guggenheim Memorial Foundation
	10	Harvard Society Junior Fellows	Harvard Society of Fellows
	11	MacArthur Fellows	MacArthur Foundation
	12	National Endowment for the Humanities Fellowship	National Endowment for the Humanities
	13	National Endowment for the Humanities Faculty Research Award	National Endowment for the Humanities
	14	National Humanities Center Fellowship	National Humanities Center
	15	Residency at the Center for Advanced Studies in the Behavioral Sciences	Center for Advanced Studies in the Behavioral Sciences
	16	Rockefeller Foundation Fellowship	Rockefeller Foundation
	17	Rome Prize	American Academy in Rome
	18	Herskovits Award	African Studies Association
	19	Wolf Prize	The Wolf Foundation
	20	Sidney Hook Memorial Award	Phi Beta Kappa Society
	21	Award for Distinguished Service to the Humanities	Phi Beta Kappa Society
	22	Phi Beta Kappa Book Awards	Phi Beta Kappa Society
	23	Founders Award	American Academy of Arts and Sciences

Highly Prestigious Total = 62

<b>Awards in the Arts and Humanities</b>			
<b>PRESTIGIOUS</b>			* <i>data not available</i>
<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>American Studies</b>	1	John Hope Franklin Publication Prize	American Studies Association
	2	Lora Romero First Book Publication Prize	American Studies Association



<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	3	Committee on Institutional Cooperation Faculty Fellowship	Newberry Library
<b>Classics</b>	1	APA Prize for Scholarly Outreach	American Philological Association
	2	Center for Hellenic Studies Senior Fellowship	Center for Hellenic Studies
	3	Multi-Country Regional Research Fellowships, Council of American Overseas Research Center (CAORC)*	American School of Classical Studies at Athens*
	4	Kress Publication Fellowship*	American School of Classical Studies at Athens*
<b>Comparative Literature</b>	1	Aldo and Jeanne Scaglione Prize for Comparative Literary Studies	Modern Language Association
<b>English Language and Literature</b>	1	W.Y. Boyd Literary Award	American Library Association
	2	Modern Language Association Prize for a First Book	Modern Language Association
	3	Kenneth W. Mildener Prize	Modern Language Association
	4	Mina P. Shaughnessy Prize	Modern Language Association
	5	Katherine Singer Kovacs Prize	Modern Language Association
	6	William Sanders Scarborough Prize	Modern Language Association
	7	Lois Roth Award for a Translation of a Literary Work	Modern Language Association
	8	Morton N. Cohen Award for a Distinguished Edition of Letters	Modern Language Association
	9	Modern Language Association Prize for a Distinguished Scholarly Edition	Modern Language Association
	10	Aldo and Jeanne Scaglione Prize for a Translation of a Scholarly Study of Literature	Modern Language Association
	11	Howard R. Marraro Prize	Modern Language Association
	12	Aldo and Jeanne Scaglione Prize for a Translation of a Literary Work	Modern Language Association
	13	Modern Language Association Prize for a Distinguished Bibliography	Modern Language Association
	14	Fenia and Yaakov Leviant Memorial Prize	Modern Language Association
	15	Literature Prize	Sixteenth Century Society and Conference
	16	Laurence Urdang-DSNA Award*	Dictionary Society of North America*
<b>French and Francophone Language and Literature</b>	1	Aldo and Jeanne Scaglione Prize for French and Francophone Studies	Modern Language Association
<b>German Language and Literature</b>	1	Aldo and Jeanne Scaglione Prize for Studies in Germanic Languages and Literatures	Modern Language Association
<b>Language, Societies, and Cultures</b>	1	An Wang Fellowship	Harvard Fairbank Center for East Asian Research
	2	Visiting Research Scholar*	International Research Center for Japanese Studies*
	3	Visiting Research Fellowship*	International Research Center for Japanese Studies*
	4	Aldo and Jeanne Scaglione Publication Award for a Manuscript in Italian Literary Studies	Modern Language Association
	5	Aldo and Jeanne Scaglione Prize for Studies in Slavic Languages and Literatures	Modern Language Association
	6	Aldo and Jeanne Scaglione Prize for Italian Studies	Modern Language Association
	7	Distinguished Contributions to Slavic Studies Award	American Association for the Advancement of Slavic Studies
	8	Wayne S. Vucinich Book Prize	American Association for the Advancement of Slavic Studies
	9	Barbara Jelavich Book Prize	American Association for the Advancement of Slavic Studies

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	10 AAASS/Orbis Books Prize for Polish Studies	American Association for the Advancement of Slavic Studies
	11 W. Bruce Lincoln Book Prize	American Association for the Advancement of Slavic Studies
<b>Language, Societies, and Cultures</b>	12 Jonas Greenfield Prize For Younger Semitists	American Oriental Society
	13 AAS Book Prizes	Association for Asian Studies
	14 AAS First Book Subvention Program*	Association for Asian Studies*
	15 AAS CIAC Small Grants*	Association for Asian Studies*
	16 AAS NEAC Japan Studies Grants*	Association for Asian Studies*
	17 AAS NEAC Korean Studies Grants*	Association for Asian Studies*
	18 Vilis Vitols Award*	Association for the Advancement of Baltic Studies*
	19 AABS Research Grants for Emerging Scholars*	Association for the Advancement of Baltic Studies*
	20 AABS Book Award*	Association for the Advancement of Baltic Studies*
	21 GSA Book Prize*	German Studies Association*
	22 GSA Article Prize*	German Studies Association*
	23 Kalman Silvert Award*	Latin American Studies Association*
	24 Bryce Wood Book Award*	Latin American Studies Association*
	25 Premio Iberoamericano Book Award*	Latin American Studies Association*
	26 MESA Honorary Fellows*	Middle East Studies Association*
	27 Albert Hourani Book Award	Middle East Studies Association
	28 Houshang Pourshariati Iranian Studies Book Award*	Middle East Studies Association*
<b>History</b>	1 The Herbert Baxter Adams Prize for European history (Book Prize)	American Historical Association
	2 The James A. Rawley Prize in Atlantic History (Book Prize)	American Historical Association
	3 The George Louis Beer Prize for European international history since 1895 (Book Prize)	American Historical Association
	4 The Paul Birdsall Prize for European military and strategic history since 1870 (Book Prize)	American Historical Association
	5 The James Henry Breasted Prize for history prior to 1000 A.D. (Book Prize)	American Historical Association
	6 The Albert B. Corey Prize in Canadian-American Relations, administered jointly with the Canadian Historical Association (Book Prize)	American Historical Association
	7 The John H. Dunning Prize for U.S. history (Book Prize)	American Historical Association
	8 The John E. Fagg Prize for the best publication in the history of Spain and Latin America (Book Prize)	American Historical Association
	9 The Herbert Feis Award for a book, article(s), or policy paper by an independent scholar or public historian (Book Prize)	American Historical Association
	10 The Morris D. Forkosch Prize in British, British imperial, or British Commonwealth history (Book Prize)	American Historical Association
<b>History</b>	11 The Leo Gershey Award for 17th- and 18th-century West European history (Book Prize)	American Historical Association
	12 The Joan Kelly Memorial Prize for Women's History (Book Prize)	American Historical Association
	13 The Littleton-Griswold Prize in American Law and Society (Book Prize)	American Historical Association
	14 The Russell Major Prize on the history of France (Book Prize)	American Historical Association
	15 The Howard R. Marraro Prize for Italian or Italian-U.S. history (Book Prize)	American Historical Association

<u>TAXONOMIC FIELD</u>	<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	16 The George L. Mosse Prize for European intellectual and cultural history since the Renaissance (Book Prize)	American Historical Association
	17 The Premio del Rey Prize (biennial) for early Spanish history (500-1516 A.D.) (Book Prize)	American Historical Association
	18 The Wesley-Logan Prize in African Diaspora History (Book Prize)	American Historical Association
	19 The J. Franklin Jameson Fellowship	American Historical Association
	20 The Fellowship in Aerospace History	American Historical Association
	21 The J. Franklin Jameson Prize for Outstanding Editorial Achievement	American Historical Association
	22 The William Gilbert Award for the best article on teaching history	American Historical Association
	23 The First Books Program (1977–1983) designed for on junior faculty members	American Historical Association
<b>History</b>	24 James Hazen Hyde Prize (1948) for the best work on Franco-American relations or on the history of France in the nineteenth century.	American Historical Association
	25 Moses Coit Tyler Prize (1957–1961) for the best manuscript in American intellectual history.	American Historical Association
	26 Robert Livingston Schuyler Prize (1951–1991) The Schuyler Prize was superseded by the Forkosch Prize in 1993.	American Historical Association
	27 Watumull Prize (1945–1982) for the best book on the history of India.	American Historical Association
	28 Jacques Barzun Prize in Cultural History	American Philosophical Society
	29 The Frank S. and Elizabeth D. Brewer Prize	American Society of Church History
	30 The Albert C. Outler Prize	American Society of Church History
	31 The Philip Schaff Prize	American Society of Church History
	32 The Jane Dempsey Douglass Prize	American Society of Church History
	33 Lloyd Lewis Fellowships in American History	Newberry Library
	34 ABC-CLIO America: History and Life Award	Organization of American Historians
	35 Willi Paul Adams Award	Organization of American Historians
	36 Ray Allen Billington Prize	Organization of American Historians
	37 Binkley-Stephenson Award	Organization of American Historians
	38 Avery O. Craven Award	Organization of American Historians
	39 Ellis W. Hawley Prize	Organization of American Historians
	40 Liberty Legacy Foundation Award	Organization of American Historians
	41 James A. Rawley Prize	Organization of American Historians
	42 David Thelen Award (Foreign Language Article Prize)	Organization of American Historians
	43 White House Historical Association Fellowships	Organization of American Historians
	44 Mellon Fellowships for Assistant Professors	Institute for Advanced Study
	45 Frederick Burkhardt Fellowship for recently tenured scholars	Institute for Advanced Study
	46 School of Historical Studies Membership	Institute for Advanced Study
	47 The David Pinkney Prize for the best book on French history	Society for French Historical Studies
<b>History</b>	48 Gilbert Chinard Prize	Society for French Historical Studies
	49 The William Koren, Jr. Prize	Society for French Historical Studies
	50 The William H. Welch Medal	American Association for the History of Medicine
	51 The J. Worth Estes Prize	American Association for the History of Medicine
	52 Annibel Jenkins Biography Prize	American Society for Eighteenth Century Studies
	53 Clifford Prize	American Society for Eighteenth Century Studies

<u>TAXONOMIC FIELD</u>	<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	54 Gottschalk Prize	American Society for Eighteenth Century Studies
	55 Emile Du Chatelet Award for Independent Scholarship	American Society for Eighteenth Century Studies
	56 Oscar Kenshur Book Prize*	American Society for Eighteenth Century Studies*
	57 ASECS Women's Caucus Editing and Translation Fellowship	American Society for Eighteenth Century Studies
	58 George Perkins Marsh Prize for Best Book in Environmental History	American Society for Environmental History Awards
	59 Leopold-Hidy Prize for Best Article in <i>Environmental History</i>	American Society for Environmental History Awards
	60 Alice Hamilton Prize or Best Article Outside <i>Environmental History</i>	American Society for Environmental History Awards
	61 Surrency Prize for the best article published in the <i>Law and History Review</i>	American Society for Legal History
	62 Sutherland Prize for the best article on English legal history	American Society for Legal History
	63 Cromwell Book Prize	American Society for Legal History
	64 John Philip Reid Book Award	American Society for Legal History
	65 Paul L. Murphy Award	American Society for Legal History
	66 Pfizer Award for an outstanding book	History of Science Society
<b>History</b>	67 Derek Price/Rod Webster Prize (outstanding articles)	History of Science Society
	68 The Margaret W. Rossiter History of Women in Science Prize	History of Science Society
	69 Watson Davis and Helen Miles Davis Prize (best books for general readers)	History of Science Society
	70 J. Willard Hurst Prize for Legal History	Law and Society Association
	71 Harry J. Kalven, Jr. Prize	Law and Society Association
	72 John Nicholas Brown Prize	Medieval Academy of America
	73 Van Courtlandt Elliott Prize	Medieval Academy of America
	74 Book Award	National Council on Public History
	75 G. Wesley Johnson Award	National Council on Public History
	76 Michael C. Robinson Prize for Historical Analysis	National Council on Public History
	77 The William Nelson Prize for the best manuscript submitted to Renaissance Quarterly	Renaissance Society of America
	78 The Phyllis Goodhart Gordan Book Prize	Renaissance Society of America
	79 RSA Research Grant	Renaissance Society of America
	80 Bainton Book Prize	Sixteenth Century Society and Conference
	81 Harold J. Grimm Prize	Sixteenth Century Society and Conference
	82 Nancy Lyman Roelker Prize	Sixteenth Century Society and Conference
	83 Carl S. Meyer Prize for the best paper delivered at the yearly meeting	Sixteenth Century Society and Conference
	84 SCSC Literature Prizes	Sixteenth Century Society and Conference
	85 Leonardo da Vinci Medal	Society for the History of Technology
	86 The Sidney Edelstein Prize	Society for the History of Technology
	87 The Sally Hacker Prize	Society for the History of Technology
	88 Abbott Payson Usher Prize	Society for the History of Technology
	89 The Joan Cahalin Robinson Prize	Society for the History of Technology
	90 The Samuel Eleazar and Rose Tartakow Levinson Prize	Society for the History of Technology
<b>History</b>	91 The IEEE Life Members' Prize in Electrical History	Society for the History of Technology
	92 The Eugene S. Ferguson Prize	Society for the History of Technology
	93 Charles S. Sydnor Award	Southern Historical Association
	94 Frank L. and Harriet C. Owsley Award	Southern Historical Association

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	95 Fletcher M. Green and Charles W. Ramsdell Award	Southern Historical Association
	96 Francis B. Simkins Award	Southern Historical Association
	97 H. L. Mitchell Award	Southern Historical Association
	98 The Bennett H. Wall Award (Book Prize)	Southern Historical Association
	99 John W. Blassingame Award	Southern Historical Association
	100 William F. Holmes Award	Southern Historical Association
	101 Theodore Saloutos Book Award*	Immigration and Ethnic History Society*
	102 Carlton C. Qualey Memorial Article Award*	Immigration and Ethnic History Society*
	103 History Manuscript Award	American Institute of Aeronautics and Astronautics
	104 LeRoy E. Doggett Award for Historical Astronomy	American Astronomical Society -- Historical Astronomy Division
	105 Pais Prize (history of Physics)	American Physical Society
	106 Albert Leon Whiteman Memorial Prize	American Mathematical Society
	107 Orr E. Reynolds Award	American Physiological Society
	108 Civil Engineering History and Heritage Award	American Society of Civil Engineers
	109 Engineer-Historian Award*	American Society of Mechanical Engineers*
	110 American Poultry Historical Society Award*	Poultry Science Association*
	111 Robert L. Kindrick–CARA Award for Outstanding Service to Medieval Studies*	Medieval Academy of America*
	112 Erik Barnouw Award	Organization of American Historians
	113 Robert Kelley Memorial Award	National Council on Public History
	114 Sixteenth Century Society and Conference Medal*	Sixteenth Century Society and Conference*
<b>History of Art, Architecture, and Archaeology</b>	1 Residence at the Pollock-Krasner Study Center	Pollock-Krasner House and the State University of New York at Stony Brook
	2 Paul Mellon Fellowship*	Center for Advanced Studies in the Visual Arts*
	3 Frese Senior Fellowship*	Center for Advanced Studies in the Visual Arts*
	4 Ailsa Mellon Bruce Senior Fellowships*	Center for Advanced Studies in the Visual Arts*
	5 Samuel H. Kress Senior Fellowships*	Center for Advanced Studies in the Visual Arts*
	6 Paul Mellon Visiting Senior Fellowship*	Center for Advanced Studies in the Visual Arts*
	7 Ailsa Mellon Bruce Visiting Senior Fellowship*	Center for Advanced Studies in the Visual Arts*
	8 Richard J. Scheuer Medals	American Schools of Oriental Research
	9 G. Ernest Wright Publication Award	American Schools of Oriental Research
	10 Frank Moore Cross Publication Award	American Schools of Oriental Research
	11 Special Recognition Award	American Schools of Oriental Research
	12 Pomerance Award for Scientific Contributions to Archaeology	Archaeological Institute of America
	13 James R. Wiseman Book Award	Archaeological Institute of America
	14 Scott Opler Emerging Scholar Fellowship for Membership	Society of Architectural Historians
	15 Sally Kress Tompkins Fellowship*	Society of Architectural Historians*
	16 Elisabeth Blair MacDougall Book Award	Society of Architectural Historians
	17 Spiro Kostof Book Award	Society of Architectural Historians
	18 Alice Davis Hitchcock Book Award	Society of Architectural Historians
	19 SAH Founders JSAH Article Award	Society of Architectural Historians
	20 Antoinette Downing Book Award	Society of Architectural Historians
	21 P.E. MacAllister Field Archaeology Award	American Schools of Oriental Research

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	22 Outstanding Public Service Award	Archaeological Institute of America
<b>Music (except performance)</b>	1 Alfred Einstein Award for outstanding article in musicology	American Musicology Society
	2 Otto Kinkeldey Award for outstanding work of musicological scholarship	American Musicology Society
	3 Lewis Lockwood Award for outstanding work of musicological scholarship	American Musicology Society
	4 Claude V. Palisca Award for outstanding Edition or Translation	American Musicology Society
	5 H. Colin Slim Award for outstanding article in musicology	American Musicology Society
	6 Robert M. Stevenson Award for outstanding scholarship in Iberian music	American Musicology Society
	7 Philip Brett Award for outstanding work in gay, lesbian, bisexual, and transgender/transsexual studies	American Musicology Society
	8 Irving Lowens Award for Best Book	Society for American Music
	9 Irving Lowens Award for Best Article	Society for American Music
	10 Earle Johnson Bequest for Book Publication Subvention*	Society for American Music*
	11 The Wallace Berry Award for a distinguished book	Society for Music Theory
	12 The Outstanding Publication Award	Society for Music Theory
	13 The Emerging Scholar Award	Society for Music Theory
	14 Ida Halpern Fellowship and Award	Society for Ethnomusicology
	15 Jaap Kunst Prize for the most significant article in ethnomusicology written by a member of the Society	Society for Ethnomusicology
	16 Alan Merriam Prize	Society for Ethnomusicology
	17 Robert M. Stevenson Prize	Society for Ethnomusicology
	18 Klaus P. Wachsmann Prize for Advanced and Critical Essays in Organology	Society for Ethnomusicology
	19 Honorary Membership	Society for Ethnomusicology
<b>Philosophy</b>	1 Henry M. Phillips Prize	American Philosophical Society
	2 Faculty Fellowship at the Edmond J. Safra Foundation Center for Ethics	Harvard University Edmond J. Safra Foundation Center for Ethics
	3 Laurance S. Rockefeller Visiting Fellowships	Princeton University Center for Human Values
	4 APA Article Prize	American Philosophical Association
	5 APA Barwise Prize	American Philosophical Association
	6 APA Baumgardt Memorial Fellowship	American Philosophical Association
	7 APA Berger Memorial Prize	American Philosophical Association
	8 APA Book Prize	American Philosophical Association
	9 APA Edinburgh Fellowship	American Philosophical Association
	10 APA Latin American Thought	American Philosophical Association
	11 Prometheus Prize	American Philosophical Association
	12 APA Frank Chapman Sharp Memorial Prize	American Philosophical Association
	13 APA Royce Lectures in the Philosophy of Mind	American Philosophical Association
<b>Religion</b>	1 American Academy of Religion Individual Research Grant	American Academy of Religion
	2 American Academy of Religion Collaborative Research Grant	American Academy of Religion
	3 American Academy of Religion Book Award	American Academy of Religion

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Spanish and Portuguese Language and Literature</b>	1	MLA Prize in United States Latina and Latino and Chicana and Chicano Literary and Cultural Studies	Modern Language Association
<b>Theatre and Performance Studies</b>	1	Errol Hill Award	American Society for Theatre Research
	2	ASTR Research Fellowship*	American Society for Theatre Research*
	3	Joseph Callaway Prize	Department of English, New York University
	4	George Freedley Award	Theatre Library Association
<b>Multidisciplinary</b>	1	Award for Humanistic Studies	American Academy of Arts and Sciences
	2	Achievement Award	American Association for University Women
	3	Stonewall Book Awards	American Library Association
	4	Coretta Scott King Book Award	American Library Association
	5	Winsor (Justin) Prize for Library History Essay	American Library Association
	6	Davis (Donald G.) Article Award	American Library Association
	7	Notable Books for Adults*	American Library Association*
	8	Dartmouth Medal	American Library Association
	9	World Book Award*	American Library Association*
	10	Huntington Medal	American Numismatic Society
	11	Distinguished Achievement Award	Andrew W. Mellon Foundation
	12	Faculty Fellowship*	Center for the Humanities*
	13	Fulbright Grant	Council for International Exchange of Scholars
	14	Columbia University Fellow	Columbia Society of Fellows in the Humanities
	15	Residency at the Getty Center	The Getty Foundation
	16	Non-residency Grant	The Getty Foundation
	17	Harry Frank Guggenheim Research Grants	Harry Frank Guggenheim Foundation
	18	Harvard Society Senior Fellows	Harvard Society of Fellows
	19	Kyoto Prize	Inamori Foundation of Japan
	20	ACM/GLCA Faculty Fellowships*	Newberry Library*
	21	Mellon Postdoctoral Research Fellowships	Newberry Library
	22	Monticello College Foundation Fellowship for Women	Newberry Library
	23	National Endowment for the Humanities Fellowships	Newberry Library
	24	Alfred Hodder Fellowship	Princeton University Council of the Humanities
<b>Multidisciplinary</b>	25	Radcliffe Institute Fellowship	Radcliffe Institute for Advanced Study
	26	Abe Fellowship	Social Science Research Council
	27	Berlin Program for Advanced German and European Study	Social Science Research Council
	28	External Faculty Fellowship	Stanford Humanities Center
	29	Obert C. and Grace A. Tanner Visiting Fellowship	Tanner Humanities Center (University of Utah)
	30	Woodrow Wilson Center Fellowship	Woodrow Wilson International Center for Scholars
	31	Woodrow Wilson Center Senior Scholar	Woodrow Wilson International Center for Scholars
	32	Woodrow Wilson Center Regional Scholar	Woodrow Wilson International Center for Scholars
	33	The Chiang Ching-kuo Foundation Grant	The Chiang Ching-kuo Foundation for International Scholarly Exchange
	34	Residency at the America Academy in Rome	American Academy in Rome
	35	Distinguished Africanist	African Studies Association
	36	Rolf Schock Prize	Royal Swedish Academy of Sciences

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	37	Andrew Gemant Award	American Institute of Physics
	38	Romanell-Phi Beta Kappa Professorship	Phi Beta Kappa Society
	39	Common Wealth Award for Science and Invention	Sigma Xi
	40	Phyllis Franklin Award for Public Advocacy of the Humanities	Modern Language Association
	41	Benjamin Franklin Award for Distinguished Public Service	American Philosophical Society



## Awards in Life Sciences

### HIGHLY PRESTIGIOUS

\* data not available

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Animal Sciences</b>	1	Morrison Award	American Society of Animal Science
	2	Aldo Leopold Memorial Award	The Wildlife Society
	3	Award of Honor	American Dairy Science Association
<b>Biochemistry, Biophysics, and Structural Biology</b>	1	ASBMB-Merck Award	American Society for Biochemistry and Molecular Biology
<b>Biology/ Integrated Biology/ Integrated Biomedical Sciences</b>	1	Howard Hughes Medical Institute Investigators*	Howard Hughes Medical Institute*
	2	Alexander Hollaender Award in Biophysics	National Academy of Sciences
	3	Award in Molecular Biology	National Academy of Sciences
<b>Cell and Developmental Biology</b>	1	C. J. Herrick Award in Neuroanatomy	American Association of Anatomists
	2	The Amory Prize	American Academy of Arts and Sciences
<b>Ecology and Evolutionary Biology</b>	1	Theodosius Dobzhansky Prize	Society for the Study of Evolution
	2	W. S. Cooper Award	Ecological Society of America
<b>Entomology</b>	1	Founders' Memorial Award	Entomological Society of America
<b>Food Science</b>	1	Nicholas Appert Award	Institute of Food Technologists
<b>Genetics and Genomics</b>	1	Dobzhansky Prize	Behavior Genetics Association
<b>Microbiology</b>	1	Eli Lilly and Company Research Award	American Society for Microbiology
	2	Selman A. Waksman Award in Microbiology	National Academy of Sciences
<b>Nutrition</b>	1	Mead Johnson Award	American Society for Nutrition
	2	Osborne and Mendel Award	American Society for Nutrition
<b>Neuroscience and Neurobiology</b>	1	Award in Neurosciences	National Academy of Sciences
	2	Ralph W. Gerard Prize in Neuroscience	Society for Neuroscience
	3	Donald B. Lindsley Prize in Behavioral Neuroscience	Society for Neuroscience
<b>Physiology</b>	1	Walter B. Cannon Award Lectureship	American Physiological Society
	2	Arthur C. Guyton Awards for Excellence in Integrative Physiology	American Physiological Society
<b>Plant Sciences</b>	1	Adolph E. Gude, Jr. Award	American Society of Plant Biologists
	2	Charles Albert Shull Award	American Society of Plant Biologists
	3	Martin Gibbs Medal	American Society of Plant Biologists

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	4	Stephen Hales Prize	American Society of Plant Biologists
	5	Cyrus Hall McCormick-Jerome Increase Case Gold Medal	American Society of Agricultural and Biological Engineers
	6	John Deere Gold Medal	American Society of Agricultural and Biological Engineers
	7	Hall of Fame Award	American Society for Horticultural Science
	8	Award of Distinction	American Phytopathological Society
<b>Public Health</b>			
	1	Robert Wood Johnson Policy Fellowship	Institute of Medicine, National Academies
<b>Multidisciplinary</b>			
	1	Albert Lasker Awards	Albert Lasker Foundation
	2	Senior von Humboldt Fellowship*	Alexander von Humboldt Foundation*
	3	Academy Members	American Academy of Arts and Sciences
	4	NAS Members	National Academy of Sciences
	5	National Medal of Technology	National Science & Technology Medals Foundation
	6	National Medal of Science	National Science Foundation
	7	Vannevar Bush Award	National Science Foundation
	8	Nobel Prize	Royal Swedish Academy of Sciences
	9	Wolf Prize- Agriculture, Medicine	Wolf Foundation
	10	Crafoord Prize	Royal Swedish Academy of Sciences
	11	Newcomb Cleveland Prize	American Association for the Advancement of Science
	12	Packard Fellowship for Science and Engineering	David and Lucile Packard Foundation
	13	MacArthur Fellowship	MacArthur Foundation
	14	Alan T. Waterman Award	National Science Foundation
	15	Philip Hauge Abelson Prize	American Association for the Advancement of Science
	16	The Beckman Scholars Program	Arnold and Mabel Beckman Foundation
	17	Benjamin Franklin Medal (1998- present)	Franklin Institute
	18	Franklin Medal (1915- 1997)	
	19	Guggenheim Fellows	John Simon Guggenheim Memorial Foundation
	20	Kyoto Prize	Inamori Foundation of Japan
	21	Japan Prize Laureates	The Science and Technology Foundation of Japan
	22	Stockholm Water Prize	Stockholm Water Foundation
Highly Prestigious Total =	54		

**Awards in Life Sciences**

**PRESTIGIOUS**

\* data not available

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
<b>Animal Sciences</b>	1	American Feed Industry Association Award	American Dairy Science Association
	2	Cargill Animal Nutrition Young Scientist Award	American Dairy Science Association
	3	J. L. Lush Award in Animal Breeding	American Dairy Science Association
	4	Merial Dairy Management Research Award	American Dairy Science Association
	5	Pfizer Animal Health	American Dairy Science Association

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	6	William Brewster Memorial Award	American Ornithologists' Union
	7	Elliott Coues Award	American Ornithologists' Union
	8	Ned K. Johnson Young Investigator Award	American Ornithologists' Union
	9	American Feed Industry Association Award in Nonruminant Nutrition Research	American Society of Animal Science
	10	American Feed Industry Association Award in Ruminant Nutrition Research	American Society of Animal Science
	11	Rockefeller Prentice Memorial Award on Animal Breeding and Genetics	American Society of Animal Science
	12	Animal Growth and Development Award	American Society of Animal Science
	13	Animal Management Award	American Society of Animal Science
	14	Animal Physiology and Endocrinology Award	American Society of Animal Science
	15	Corbin Companion Animal Biology Award	American Society of Animal Science
	16	Meats Research Award	American Society of Animal Science
	17	C. Hart Merriam Award for Outstanding Research Contributions to the Science of Mammalogy	American Society of Mammalogists
	18	Katma Award	Cooper Ornithological Society
	19	Loye and Alden Miller Award	Cooper Ornithological Society
	20	Harry R. Painton Award	Cooper Ornithological Society
	21	American Egg Board Research Award	Poultry Science Association
	22	American Feed Industry Association Poultry Nutrition Research Award	Poultry Science Association
	23	Embrex Fundamental Science Award	Poultry Science Association
	24	Frank Perdue Live Poultry Food Safety Award	Poultry Science Association
<b>Animal Sciences</b>	25	Hy-Line International Research Award	Poultry Science Association
	26	Maple Leaf Farms Duck Research Award	Poultry Science Association
	27	Merck Award for Achievement in Poultry Science	Poultry Science Association
	28	National Chicken Council Broiler Research Award	Poultry Science Association
	29	National Turkey Federation Research Award	Poultry Science Association
	30	Poultry Science Early Achievement Awards	Poultry Science Association
	31	Poultry Welfare Research Award	Poultry Science Association
	32	Jim McDonough Award	The Wildlife Society
	33	TWS Wildlife Publication Awards	The Wildlife Society
	34	Robert H. Gibbs Jr. award	American Society of Ichthyologists and Herpetologists
	35	Fitch award for Excellence in Herpetology	American Society of Ichthyologists and Herpetologists
	36	Robert K. Johnson award	American Society of Ichthyologists and Herpetologists
<b>Biochemistry, Biophysics, and Structural Biology</b>	1	Anatrace Membrane Protein Award	Biophysical Society
	2	Avanti Award in Lipids	Biophysical Society
	3	Fellow of the Biophysical Society	Biophysical Society
	4	Margaret Oakley Dayhoff Award	Biophysical Society
	5	Michael and Kate Barany Award for Young Investigators	Biophysical Society

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	6	U. S. Genomics Award for Outstanding Investigator in the field of Single Molecule Biology	Biophysical Society
	7	Bioenergetics Young Investigator Award	Biophysical Society
	8	Biological Fluorescence Gregario Weber Award for Excellence in Fluorescence Theory and Applications	Biophysical Society
	9	Exocytosis/Endocytosis Sir Bernard Katz Award for Excellence in Research in Exocytosis and Endocytosis	Biophysical Society
	10	Membrane Biophysics K. S. Cole Award	Biophysical Society
	11	Founders Award	Biophysical Society
	12	ASBMB-Amgen Award*	American Society for Biochemistry and Molecular Biology*
	13	Avanti Award in Lipids	American Society for Biochemistry and Molecular Biology
	14	ASBMB/Schering-Plough Research Institute Award	American Society for Biochemistry and Molecular Biology
	15	Herbert Tabor/Journal of Biological Chemistry Lectureship	American Society for Biochemistry and Molecular Biology
	16	William C. Rose Award	American Society for Biochemistry and Molecular Biology
	17	Herbert A. Sober Lectureship	American Society for Biochemistry and Molecular Biology
	18	Fritz Lipmann Lectureship	American Society for Biochemistry and Molecular Biology
<b>Biology/ Integrated Biology/ Integrated Biomedical Sciences</b>			
	1	AIBS Distinguished Scientist Award	American Institute of Biological Sciences
	2	AIBS President's Citation Award	American Institute of Biological Sciences
	3	Geron Corporation-Samuel Goldstein Distinguished Publication Award	Gerontological Society of America
	4	Nathan Shock New Investigator Award	Gerontological Society of America
	5	Best Paper Award	Society for Experimental Biology and Medicine
	6	Young Investigator Awards	Society for Experimental Biology and Medicine
	7	President's Award	Society of Systematic Biologists
	8	Akira Okubo Prize	Society for Mathematical Biology
<b>Cell and Developmental Biology</b>			
	1	R. R. Bensley Award in Cell Biology	American Association of Anatomists
	2	Henry Gray Award/Lippincott Williams & Wilkins Scientific Achievement Award	American Association of Anatomists
	3	H. W. Mossman Developmental Biologist Award	American Association of Anatomists
	4	AAA Young Anatomist Publication Award	American Association of Anatomists
	5	Lifetime Achievement Award	Society for In Vitro Biology
	6	Senior Investigator Award	Society for In Vitro Biology
	7	President's Award	Society for In Vitro Biology
	8	Young Scientist Award	Society for In Vitro Biology
	9	E.B. Wilson Medal	American Society for Cell Biology
	10	WICB Junior Award	American Society for Cell Biology
	11	WICB Senior Award	American Society for Cell Biology
	12	E.E. Just Lecture	American Society for Cell Biology
	13	MAC Poster Award	American Society for Cell Biology

<b><u>TAXONOMIC FIELD</u></b>	<b><u>AWARD NAME</u></b>	<b><u>GRANTING ORGANIZATION</u></b>
	14 MBC Paper of the Year	American Society for Cell Biology
	15 Merton Bernfield Memorial Award	American Society for Cell Biology
	16 Early Career Life Scientist Award	American Society for Cell Biology
<b>Ecology and Evolutionary Biology</b>		
	1 Robert H. MacArthur Award	Ecological Society of America
	2 Eminent Ecologist Award	Ecological Society of America
	3 George Mercer Award	Ecological Society of America
	4 Sustainability Science Award	Ecological Society of America
	5 Gilbert Morgan Smith Medal	National Academy of Sciences
	6 Walcott Medal, Charles Doolittle	National Academy of Sciences
<b>Entomology</b>		
	1 Fellow	Entomological Society of America
	2 Distinguished Achievement Award in Horticultural Entomology	Entomological Society of America
	3 Recognition Award in Insect Physiology, Biochemistry & Toxicology	Entomological Society of America
	4 Entomological Foundation Award for Excellence in Integrated Pest Management	Entomological Society of America
	5 Entomological Foundation Recognition Award in Urban Entomology	Entomological Society of America
	6 Entomological Foundation Thomas Say Award	Entomological Society of America
	7 Recognition Award in Entomology	Entomological Society of America
<b>Food Science</b>		
	1 DSM Food Specialties Award	American Dairy Science Association
	2 Food Structure and Functionality Division Achievement Award	American Oil Chemists' Society
	3 Babcock-Hart Award	Institute of Food Technologists
	4 Samuel Cate Prescott Award	Institute of Food Technologists
	5 Bor S. Luh International Award	Institute of Food Technologists
	6 Stephen S. Chang Award for Lipid or Flavor Science	Institute of Food Technologists
	7 Research and Development Award	Institute of Food Technologists
	8 Marcel Loncin Research Prize	Institute of Food Technologists
	9 Bernard L. Oser Food Ingredient Safety Award	Institute of Food Technologists
<b>Genetics and Genomics</b>		
	1 Kimber Genetics Award	National Academy of Sciences
<b>Immunology and Infectious Disease</b>		
	1 Abbott Laboratories Award in Clinical and Diagnostic Immunology	American Society for Microbiology
	2 Investigators in Pathogenesis of Infectious Diseases	Burroughs Wellcome Fund
	3 Clinical Scientist Awards in Translational Research	Burroughs Wellcome Fund
<b>Microbiology</b>		
	1 Abbott-ASM Lifetime Achievement Award	American Society for Microbiology

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
		Proctor & Gamble Award in Applied and Environmental	
	2	Microbiology	American Society for Microbiology
	3	sanofi-aventis U. S. Award	American Society for Microbiology
	4	USFCC/J. Roger Porter Award	American Society for Microbiology
	5	BD Award for Research in Clinical Microbiology	American Society for Microbiology
	6	Dade Behring MicroScan Young Investigator Award	American Society for Microbiology
	7	Scherago-Rubin Award	American Society for Microbiology
	8	ICAAC Young Investigator Awards	American Society for Microbiology
	9	Merck Irving S. Sigal Memorial Awards	American Society for Microbiology
<b>Neuroscience and Neurobiology</b>			
	1	Jacob P. Waletzky Memorial Award for Innovative Research in Drug Addiction and Alcoholism	Society for Neuroscience
	2	Committee on Women in Neuroscience (C-WIN) Achievement Awards	Society for Neuroscience
	3	Karl Spencer Lashley Award	American Philosophical Society
	4	Peter Gruber Foundation Neuroscience Prize	Society for Neuroscience
	5	Peter Gruber International Research Award in Neuroscience	Society for Neuroscience
	6	Young Investigator Award	Society for Neuroscience
	7	Mika Saltpeter Lifetime Achievement Award	Society for Neuroscience
<b>Nursing</b>			
	1	Doris Schwartz Nursing Research Award	Gerontological Society of America
<b>Nutrition</b>			
	1	Edna and Robert Langholz International Nutrition Award*	American Dietetic Association*
	2	Mary P. Huddleson Memorial Award*	American Dietetic Association*
	3	Elaine Monsen Award*	American Dietetic Association*
	4	Ross Award in Women's Health*	American Dietetic Association*
	5	Margaret Dullea Simko Award for Excellence at a Clinical Poster Session*	American Dietetic Association*
	6	ASN Fellow	American Society for Nutrition
	7	Bio-Serv Award	American Society for Nutrition
	8	Centrum Center for Nutrition Science Award	American Society for Nutrition
	9	Robert H. Herman Memorial Award	American Society for Nutrition
	10	Kellogg Prize in International Nutrition Research	American Society for Nutrition
	11	Norman Kretchmer Memorial Award	American Society for Nutrition
	12	David Kritchevsky Outstanding Nutrition Career Award	American Society for Nutrition
	13	E.V. McCollum Award	American Society for Nutrition
	14	Nutrition Science Journalism Award	American Society for Nutrition
	15	Physician Nutrition Specialist Award	American Society for Nutrition
	16	Peter J. Reeds Memorial Young Investigator Award	American Society for Nutrition
	17	E.L.R. Stokstad Award	American Society for Nutrition
	18	Milton L. Sunde Award	American Society for Nutrition

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	19	Vernon R. Young International Award for Amino Acid Research	American Society for Nutrition
<b>Pharmacology, Toxicology and Environmental Health</b>			
	1	NAS Award for Environmental Quality	National Academy of Sciences
	2	Volwiler Research Achievement Award*	American Association of Colleges of Pharmacy*
	3	Ebert Prize	American Pharmacists Association
	4	Research Achievement Award in the Pharmaceutical Sciences	American Pharmacists Association
	5	Takeru Higuchi Research Prize	American Pharmacists Association
	6	John J. Abel Award in Pharmacology	American Society for Pharmacology and Experimental Therapeutics
	7	ASPET-Astellas Awards in Translational Pharmacology*	American Society for Pharmacology and Experimental Therapeutics*
	8	Pharmacia -- ASPET Award for Experimental Therapeutics	American Society for Pharmacology and Experimental Therapeutics
	9	Benedict R. Lucchesi Distinguished Lectureship in Cardiac Pharmacology*	American Society for Pharmacology and Experimental Therapeutics*
	10	ASPET Division for drug Metabolism Early Career Achievement Award*	American Society for Pharmacology and Experimental Therapeutics*
	11	Epilepsy Research Award for Outstanding Contributions to the Pharmacology of Antiepileptic Drugs	American Society for Pharmacology and Experimental Therapeutics
	12	Torald Sollmann Award in Pharmacology	American Society for Pharmacology and Experimental Therapeutics
	13	P. B. Dews Award for Research in Behavioral Pharmacology	American Society for Pharmacology and Experimental Therapeutics
	14	Goodman and Gilman Award in Receptor Pharmacology	American Society for Pharmacology and Experimental Therapeutics
	15	Bernard B. Brodie Award in Drug Metabolism	American Society for Pharmacology and Experimental Therapeutics
	16	Paul M. Vanhoutte Distinguished Lectureship in Vascular Pharmacology*	American Society for Pharmacology and Experimental Therapeutics*
	17	Drug Discovery, Drug Development & Regulatory Affairs Young Investigator Award*	American Society for Pharmacology and Experimental Therapeutics*
	18	Julius Axelrod Award	American Society for Pharmacology and Experimental Therapeutics
<b>Physiology</b>			
	1	Distinguished Lectureship Awards	American Physiological Society
	2	Giles F. Filley Memorial Awards for Excellence in Respiratory Physiology and Medicine	American Physiological Society
	3	Robert W. Berliner Award for Excellence in Renal Physiology*	American Physiological Society -- Renal Section*

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	4	Shih-Chun Wang Young Investigator Award	American Physiological Society
	5	Lazaro J. Mandel Young Investigator Award	American Physiological Society
	6	Carl J. Wiggers Award	American Physiological Society -- Cardiovascular Section
	7	Cardiovascular Section New Investigator Award*	American Physiological Society -- Cardiovascular Section*
	8	Cardiovascular Section Research Recognition Awards	American Physiological Society -- Cardiovascular Section
	9	Cardiovascular Section Young Investigator Award Sponsored by Bristol-Myers Squibb*	American Physiological Society -- Cardiovascular Section*
	10	Cardiovascular Section Clinical Science Young Investigator Award Sponsored by Portland Press*	American Physiological Society -- Cardiovascular Section*
	11	Cell and Molecular Physiology Section New Investigator Award*	American Physiological Society -- Cell and Molecular Physiology Section*
	12	Cell and Molecular Physiology Research Recognition Awards	American Physiological Society -- Cell and Molecular Physiology Section
	13	Central Nervous System New Investigator Award*	American Physiological Society -- Central Nervous System Section*
	14	Central Nervous System Section Research Recognition Award	American Physiological Society -- Central Nervous System Section
	15	Comparative and Evolutionary Physiology Section New Investigator Award*	American Physiological Society -- Comparative and Evolutionary Physiology Section*
	16	Comparative and Evolutionary Physiology Section Research Recognition Award	American Physiological Society -- Comparative and Evolutionary Physiology Section
	17	Comparative Physiology Section Scholander Award*	American Physiological Society -- Comparative and Evolutionary Physiology Section*
	18	Endocrinology & Metabolism Section New Investigator Award*	American Physiological Society -- Endocrinology and Metabolism Section*
	19	Virendra B. Mahesh Award of Excellence in Endocrinology*	American Physiological Society -- Endocrinology and Metabolism Section*
	20	Mead Johnson Research Award in Endocrinology and Metabolism*	American Physiological Society -- Endocrinology and Metabolism Section*
	21	New Investigator Award*	American Physiological Society -- Environmental and Exercise Physiology Section*
	22	Honor Award*	American Physiological Society -- Environmental and Exercise Physiology Section*
	23	Recognition Award for Beginning Investigators*	American Physiological Society -- Environmental and Exercise Physiology Section*
	24	Gatorade Beginning Investigator Award*	American Physiological Society -- Environmental and Exercise Physiology Section*
<b>Physiology</b>	25	Military Physiology Award for Beginning Investigators*	American Physiological Society -- Environmental and Exercise Physiology Section*
	26	Gravitational Physiology Award for Beginning Investigators*	American Physiological Society -- Environmental and Exercise Physiology Section*
	27	Young Investigator Award*	American Physiological Society -- Epithelial Transport Group*



<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	28	APS Horace W. Davenport Distinguished Lectureship*	American Physiological Society -- Gastrointestinal and Liver Physiology Section*
	29	Takeda Distinguished Research Award*	American Physiological Society -- Gastrointestinal and Liver Physiology Section
	30	New Investigator Award	American Physiological Society -- Gastrointestinal and Liver Physiology Section*
	31	Takeda Research Recognition Awards*	American Physiological Society -- Gastrointestinal and Liver Physiology Section*
	32	New Investigator Award*	American Physiological Society -- Neural Control and Autonomic Regulation Section*
	33	Research Recognition Award	American Physiological Society -- Neural Control and Autonomic Regulation Section
	34	Michael J. Brody Young Investigator Award*	American Physiological Society -- Neural Control and Autonomic Regulation Section*
	35	Young Investigator Award*	American Physiological Society -- Renal Section*
	36	New Investigator Award*	American Physiological Society -- Renal Section*
	37	Research Recognition Award	American Physiological Society -- Renal Section
	38	New Investigator Award*	American Physiological Society -- Respiration Section*
	39	Research Recognition Award	American Physiological Society -- Respiration Section
	40	New Investigator Award*	American Physiological Society -- Water and Electrolyte Homeostasis Section*
	41	Bowditch Award Lectureship	American Physiological Society
	42	G. Edgar Folk Senior Physiologists Award*	American Physiological Society*
	43	Berne Distinguished Lectureship	American Physiological Society -- Cardiovascular Section
	44	Edward F. Adolph Distinguished Lectureship*	American Physiological Society -- Environmental and Exercise Physiology Section*
	45	Carl W. Gottschalk Distinguished Lectureship*	American Physiological Society -- Renal Section*
<b>Plant Sciences</b>			
	1	William Starling Sullivant Award	American Bryological and Lichenological Society
	2	Edward Tuckerman Award	American Bryological and Lichenological Society
	3	Ruth Allen Award	American Phytopathological Society
	4	Noel T. Keen Award for Research in Molecular Plant Pathology	American Phytopathological Society
	5	Lee M. Hutchins Award	American Phytopathological Society
	6	William Boright Hewitt and Maybelle Ellen Ball Hewitt Award	American Phytopathological Society
	7	Outstanding International Horticulturist	American Society for Horticultural Science
	8	Outstanding Researcher	American Society for Horticultural Science
	9	Cross-Commodity Publication	American Society for Horticultural Science
	10	Fruit Publication	American Society for Horticultural Science
	11	Ornamentals Publication	American Society for Horticultural Science
	12	Vegetable Publication	American Society for Horticultural Science
	13	Hancor Soil and Water Engineering Award	American Society of Agricultural and Biological Engineers

<u>TAXONOMIC FIELD</u>	<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	14 G. B. Gunlogson Countryside Engineering Award	American Society of Agricultural and Biological Engineers
	15 Asabe Kishida International Award	American Society of Agricultural and Biological Engineers
	16 Namic Engineering Safety Award	American Society of Agricultural and Biological Engineers
<b>Plant Sciences</b>	17 Sunkist Young Designer Award	American Society of Agricultural and Biological Engineers
	18 New Holland Young Researcher Award	American Society of Agricultural and Biological Engineers
	19 Mayfield Cotton Engineering Award	American Society of Agricultural and Biological Engineers
	20 National Food & Energy Council Electric Technology Award	American Society of Agricultural and Biological Engineers
	21 Rain Bird Engineering Concept of the Year	American Society of Agricultural and Biological Engineers
	22 Award for the Advancement of Surface Irrigation	American Society of Agricultural and Biological Engineers
	23 Heermann Sprinkler Irrigation Award	American Society of Agricultural and Biological Engineers
	24 FPSA-FPEI Food Engineering Award	American Society of Agricultural and Biological Engineers
	25 Syngenta Crop Protection Recognition Award	American Society of Agronomy
	26 ASA Fellow	American Society of Agronomy
	27 Carl Sprengel Agronomic Research Award	American Society of Agronomy
	28 Environmental Quality Research Award	American Society of Agronomy
	29 Werner L. Nelson Award for Diagnosis of Yield-Limiting Factors	American Society of Agronomy
	30 Charles F. Kettering Award	American Society of Plant Biologists
	31 Charles Reid Barnes Lifetime Membership Award	American Society of Plant Biologists
	32 Dennis R. Hoagland Award	American Society of Plant Biologists
	33 Early Career Award	American Society of Plant Biologists
	34 Fellow of ASPB	American Society of Plant Biologists
<b>Plant Sciences</b>	35 Lawrence Bogorad Award for Excellence in Plant Biology Research	American Society of Plant Biologists
	36 Centennial Awards	Botanical Society of America
	37 BSA Merit Award	Botanical Society of America
	38 Michael Cichan Award	Botanical Society of America
	39 Darbaker Prize	Botanical Society of America
	40 Henry Allan Gleason Award	Botanical Society of America
	41 Margaret Menzel Award	Botanical Society of America
	42 Jeanette Siron Pelton Award	Botanical Society of America
	43 Winfried and Renate Remy Award	Botanical Society of America
	44 Edgar T. Wherry Award	Botanical Society of America
	45 Physiological Section Li-Core Prize	Botanical Society of America
	46 Young Crop Scientist Award	Crop Science Society of America
	47 CSSA Fellow	Crop Science Society of America
	48 Crop Science Research Award	Crop Science Society of America
	49 Frank N. Meyer Medal for Plant Genetic Resources	Crop Science Society of America
	50 Fred V. Grau Turfgrass Science Award	Crop Science Society of America
	51 Seed Science Award	Crop Science Society of America
	52 Gifford Pinchot Medal	Society of American Foresters
	53 Barrington Moore Memorial Award in Biological Science	Society of American Foresters

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	54 SAF Award in Forest Science	Society of American Foresters
	55 Presidential Field Forester Award	Society of American Foresters
	56 Early Career Outstanding Scientist Award*	Weed Science Society of America*
	57 Outstanding Research Award*	Weed Science Society of America*
	58 Fellow	American Phytopathological Society
	59 Monsanto Crop Science Distinguished Career Award	Crop Science Society of America
	60 Assey Gray award	American Society for Plant Taxonomy
	61 Gerald W. Prescott award	Phycological Society of America
	62 Luigi Provasoli award	Phycological Society of America
	63 Award of Excellence	Phycological Society of America
	64 Distinguished Mycologist award	Mycological Society of America
	65 C. J. Alexopoulos award	Mycological Society of America
	66 MSA Fellow	Mycological Society of America
<b>Public Health</b>	1 Sedgwick Memorial Prize	American Public Health Association
	2 APHA Award for Excellence	American Public Health Association
	3 Jay S. Drotman Memorial Award	American Public Health Association
	4 APHA-GlaxoSmithKline Partnership Award	American Public Health Association
	5 Executive Director Citation	American Public Health Association
	6 Presidential Citation	American Public Health Association
	7 Gustav O. Lienhard award	Institute of Medicine, National Academies
	8 Edward T. LaRoe III award	Society for Conservation Biology
<b>Biotechnology</b>	1 Promega Biotechnology Research Award	American Society for Microbiology
<b>Multidisciplinary</b>	1 Humboldt Research Fellowships*	Alexander von Humboldt Foundation*
	2 ACR Gold Medal Award	American College of Radiology
	3 ADSA Foundation Scholar Award	American Dairy Science Association
	4 International Dairy Foods Association Research Award	American Dairy Science Association
	5 Land O'Lakes, Inc. Award	American Dairy Science Association
	6 Pioneer Hi-Bred Forage Award	American Dairy Science Association
	7 West Agro, Inc. Award	American Dairy Science Association
	8 Nutrition Professionals, Inc. Applied Dairy Nutrition Award	American Dairy Science Association
	9 FASS-AFIA New Frontiers in Animal Nutrition Award	American Dairy Science Association
	10 Early Career Professional Award	American Society of Agronomy/ Crop Science Society of America/ Soil Science Society of America
	11 L. R. Ahuja Ag Systems Modeling Award	American Society of Agronomy/ Crop Science Society of America/ Soil Science Society of America
	12 Rhoda and Bernard Sarnat International Award in Mental Health	Institute of Medicine, National Academies
	13 Fraunhofer Bessel Research Awards*	Alexander von Humboldt Foundation*
	14 Helmholtz Association*	Alexander von Humboldt Foundation*

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	15	Sofja Kovalevskaja Award*	Alexander von Humboldt Foundation*
	16	Friedrich Wilhelm Bessel Research Awards*	Alexander von Humboldt Foundation*
	17	Max Planck Research Award*	Alexander von Humboldt Foundation*
	18	Thyssen Humboldt Awards*	Alexander von Humboldt Foundation*
	19	The Rumford Prize	American Academy of Arts and Sciences
	20	Judson Daland Prize	American Philosophical Society
	21	Benjamin Franklin Medal	American Philosophical Society
	22	Thomas Jefferson Medal	American Philosophical Society
	23	Magellanic Premium	American Philosophical Society
	24	Henry M. Phillips Prize	American Philosophical Society
	25	Honors of the Association	American Speech-Language-Hearing Association
	26	Early Career Contributions in Research Award	American Speech-Language-Hearing Association
	27	Clinical Scientist of the Year	Association of Clinical Scientists
	28	Diploma of Honor	Association of Clinical Scientists
	29	Young Clinical Scientist Award	Association of Clinical Scientists
	30	Abraham J. Gitlitz Memorial Lectureship	Association of Clinical Scientists
<b>Multidisciplinary</b>	31	Claude P. Brown Memorial Lectureship	Association of Clinical Scientists
	32	Bower Award	Franklin Institute
	33	John Price Wetherill Medal	Franklin Institute
	34	Elliott Cresson Medal	Franklin Institute
	35	Bolton L. Corson Medal	Franklin Institute
	36	Louis E. Levy Medal	Franklin Institute
	37	Robert W. Kleemeier Award	Gerontological Society of America
	38	M. Powell Lawton Award	Gerontological Society of America
	39	Maxwell A. Pollack Award for Productive Aging	Gerontological Society of America
	40	Joseph T. Freeman Award	Gerontological Society of America
	41	Health Sciences Research Award	Gerontological Society of America
	42	Harry Frank Guggenheim Grant	Harry Frank Guggenheim Foundation
	43	Elliot Medal, Daniel Giraud	National Academy of Sciences
	44	Carty Award, John J.	National Academy of Sciences
	45	Award for the Industrial Application of Science	National Academy of Sciences
	46	Award for Initiatives in Research	National Academy of Sciences
	47	Jessie Stevenson Kovalenko Medal	National Academy of Sciences
	48	Richard Lounsbery Medal	National Academy of Sciences
	49	Cottrell Scholar Awards*	Research Corporation*
	50	Research Innovation Awards*	Research Corporation*
	51	Research Opportunity Awards*	Research Corporation*
	52	Cottrell College Science Award*	Research Corporation*
	53	Distinguished Scientist Award*	Society for Advancement of Chicanos and Native Americans in Science*
	54	Gairdner Award	The Gairdner Foundation
	55	Sloan Research Fellowship	Alfred P. Sloan Foundation
	56	Founders Distinguished Senior Scholar	American Association of University Women

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	57	Beckman Young Investigators (BYI)	Arnold and Mabel Beckman Foundation
	58	NAED Members	National Academy of Education
	59	Presidential Early Career Awards for Scientists and Engineers (PECASE)	National Science Foundation
<b>Multidisciplinary</b>	60	Searle Scholar	Searle Scholars Program
	61	Pew Scholars in the Biomedical Sciences	The Pew Charitable Trusts
	62	Distinguished Young Scholars in Medical Research Program	W.M. Keck Foundation
	63	Faculty Early Career Development (CAREER) Award*	National Science Foundation*
	64	Young Investigator Program Award*	Office of Naval Research*
	65	Radcliffe Institute Fellowship	Radcliffe Institute for Advanced Study
	66	Rockefeller Fellowships	Rockefeller Foundation
	67	Anniversary Fellows Program	Institute of Medicine, National Academies
	68	IREX Grant*	International Research and Exchanges Board*
	69	Fulbright Awards	Council for International Exchange of Scholars
	70	AAAS Fellows	American Association for the Advancement of Science
Prestigious Total =	348		

## Awards in Physical Sciences and Engineering

HIGHLY PRESTIGIOUS

\* data not available

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
<b><u>Aerospace Engineering</u></b>	1	NAS Award in Aeronautical Engineering	National Academy of Sciences
<b><u>Applied Mathematics</u></b>	1	George David Birkhoff Prize in Applied Mathematics	American Mathematical Society
	2	Norbert Wiener Prize in Applied Mathematics	American Mathematical Society
<b><u>Astrophysics and Astronomy</u></b>	1	Henry Norris Russell Lectureship	American Astronomical Society
	2	Arctowski Medal	National Academy of Sciences
	3	Draper Medal, Henry	National Academy of Sciences
	4	James Craig Watson Medal	National Academy of Sciences
	5	Benjamin Apthorp Gould Prize	National Academy of Sciences
<b><u>Biomedical Engineering and Bioengineering</u></b>	1	Fritz J. and Dolores H. Russ Prize	National Academy of Engineering
<b><u>Chemistry</u></b>	1	NAS Award in Chemical Sciences	National Academy of Sciences
	2	NAS Award in Chemistry in Service to Society	National Academy of Sciences
	3	Priestley Medal	American Chemical Society
<b><u>Earth Sciences</u></b>	1	Thompson Medal, Mary Clark	National Academy of Sciences
	2	Warren Prize, G. K.	National Academy of Sciences
	3	Gregori Aminoff Prize	Royal Swedish Academy of Sciences
<b><u>Engineering Science and Materials</u></b>	1	Charles Stark Draper Prize	National Academy of Engineering
	2	Gordon Prize	National Academy of Engineering
	3	Founders Award	National Academy of Engineering
	4	Arthur M. Bueche	National Academy of Engineering
<b><u>Mathematics</u></b>	1	Fields Medal	International Mathematical Union
	2	Mathematics, NAS Award in	National Academy of Sciences
	3	Award in Applied Mathematics and Numerical Analysis	National Academy of Sciences
	4	Rolf Schock Prizes	Royal Swedish Academy of Sciences
<b><u>Mechanical Engineering</u></b>	1	Gibbs Brothers Medal	National Academy of Sciences
	2	ASME Medal*	American Society of Mechanical Engineers*
<b><u>Oceanography and Atmospheric Sciences and Meteorology</u></b>	1	Agassiz Medal, Alexander	National Academy of Sciences
	2	Day Prize and Lectureship, Arthur L.	National Academy of Sciences
	3	J. Lawrence Smith Medal	National Academy of Sciences
	4	George P. Merrill Award	National Academy of Sciences
	5	The Carl-Gustaf Rossby Research Medal	American Meteorological Society

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Physics</b>	1	Comstock Prize in Physics	National Academy of Sciences
<b>Information Science (Emerging Field)</b>	1	Award of Merit	American Society for Information Science and Technology
<b>Multidisciplinary</b>	1	Wolf Prize (Math, Physics and Chemistry)	Wolf Foundation
	2	Academy Members/ Fellows	American Academy of Arts and Sciences
	3	Kyoto Prize	Inamori Foundation of Japan
	4	MacArthur Fellowship	MacArthur Foundation
	5	NAS Members	National Academy of Sciences
	6	National Medal of Technology	National Science & Technology Medals Foundation
	7	National Medal of Science	National Science Foundation
	8	Nobel Prize	Royal Swedish Academy of Sciences
	9	Crafoord Prize	Royal Swedish Academy of Sciences
	10	Japan Prize Laureates	The Science and Technology Foundation of Japan
	11	Albert Lasker Awards	Albert Lasker Foundation
	12	National Inventors Hall of Fame	National Inventors Hall of Fame Foundation
	13	Academy Members	American Academy of Arts and Sciences
	14	The Rumford Prize	American Academy of Arts and Sciences
	15	Philip Hauge Abelson Prize	American Association for the Advancement of Science
	16	Newcomb Cleveland Prize	American Association for the Advancement of Science
	17	Judson Daland Prize	American Philosophical Society
	18	Benjamin Franklin Medal	American Philosophical Society
	19	Thomas Jefferson Medal	American Philosophical Society
	20	Magellanic Premium	American Philosophical Society
	21	Henry M. Phillips Prize	American Philosophical Society
	22	California Scientist of the Year Award	California Science Center
	23	Bower Award	Franklin Institute
	24	John Price Wetherill Medal	Franklin Institute
	25	Elliott Cresson Medal	Franklin Institute
	26	Bolton L. Corson Medal	Franklin Institute
	27	Louis E. Levy Medal	Franklin Institute
	28	Benjamin Franklin Medal	Franklin Institute
	29	Guggenheim Fellows	John Simon Guggenheim Memorial Foundation
	30	Elliot Medal, Daniel Giraud	National Academy of Sciences
	31	Carty Award, John J.	National Academy of Sciences
<b>Multidisciplinary</b>	32	Award for the Industrial Application of Science	National Academy of Sciences
	33	Award for Initiatives in Research	National Academy of Sciences
	34	Jessie Stevenson Kovalenko Medal	National Academy of Sciences
	35	Richard Lounsbery Medal	National Academy of Sciences
	36	Public Welfare Medal	National Academy of Sciences
	37	Award in Scientific Reviewing	National Academy of Sciences
	38	NAE Members	National Academy of Engineering

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	39	Vannevar Bush Award	National Science Foundation
	40	Alan T. Waterman Award	National Science Foundation
	41	IOM Membership	Institute of Medicine
Highly Prestigious Total =	73		

**Awards in Physical Sciences and Engineering**

PRESTIGIOUS

*\* data not available*

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
<b>Aerospace Engineering</b>	1	Dryden Lectureship Award	American Institute of Aeronautics and Astronautics
	2	Durand Lectureship Award	American Institute of Aeronautics and Astronautics
	3	von Karman Lectureship Award	American Institute of Aeronautics and Astronautics
	4	Wright Brothers Lectureship Award	American Institute of Aeronautics and Astronautics
	5	J. Leland Atwood Award	American Institute of Aeronautics and Astronautics
	6	Daniel Guggenheim Medal	American Institute of Aeronautics and Astronautics
	7	Speas Airport Award	American Institute of Aeronautics and Astronautics
	8	E. Sperry Award	American Institute of Aeronautics and Astronautics
	9	James H. Starnes Award	American Institute of Aeronautics and Astronautics
	10	Wright Brothers Trophy Award	American Institute of Aeronautics and Astronautics
	11	AIAA Foundation Award for Excellence	American Institute of Aeronautics and Astronautics
	12	Goddard Astronautics Award	American Institute of Aeronautics and Astronautics
	13	Reed Aeronautics Award	American Institute of Aeronautics and Astronautics
	14	Pendray Aerospace Literature Award	American Institute of Aeronautics and Astronautics
	15	Summerfield Book Award	American Institute of Aeronautics and Astronautics
	16	Aeroacoustics Award	American Institute of Aeronautics and Astronautics
	17	Aerospace Design Engineering Award	American Institute of Aeronautics and Astronautics
	18	Air Breathing Propulsion Award	American Institute of Aeronautics and Astronautics
	19	Aircraft Design Award	American Institute of Aeronautics and Astronautics
	20	Aerospace Communications Award	American Institute of Aeronautics and Astronautics
	21	Aerodynamic Measurement Technology Award	American Institute of Aeronautics and Astronautics
	22	Theodor W. Knacke Aerodynamic Decelerator Systems Award	American Institute of Aeronautics and Astronautics
	23	Aerospace Maintenance Award	American Institute of Aeronautics and Astronautics
	24	Aerospace Power Systems Award	American Institute of Aeronautics and Astronautics
	25	Aerodynamics Award	American Institute of Aeronautics and Astronautics
	26	Command, Control, Communication & Intelligence Award	American Institute of Aeronautics and Astronautics
	27	Computer-Aided Engineering and Manufacturing Award	American Institute of Aeronautics and Astronautics
	28	Walter J. and Angeline H. Crichlow Trust Prize	American Institute of Aeronautics and Astronautics
	29	Digital Avionics Award	American Institute of Aeronautics and Astronautics
	30	deFlorez Award for Flight Simulation	American Institute of Aeronautics and Astronautics



<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	31 Energy Systems Award	American Institute of Aeronautics and Astronautics
	32 Fluid Dynamics Award	American Institute of Aeronautics and Astronautics
	33 Aerospace Guidance, Navigation and Control Award	American Institute of Aeronautics and Astronautics
	34 Ground Testing Award	American Institute of Aeronautics and Astronautics
	35 Jeffries Aerospace Medicine and Life Sciences Research Award	American Institute of Aeronautics and Astronautics
	36 Robert M. Losey Award	American Institute of Aeronautics and Astronautics
	37 Multidisciplinary Design Optimization Award	American Institute of Aeronautics and Astronautics
	38 Mechanics and Control of Flight Award	American Institute of Aeronautics and Astronautics
	39 Missile Systems Award	American Institute of Aeronautics and Astronautics
	40 Plasmadynamics and Lasers Award	American Institute of Aeronautics and Astronautics
<b>Aerospace Engineering</b>	41 Piper General Aviation Award	American Institute of Aeronautics and Astronautics
	42 Space Automation and Robotics Award	American Institute of Aeronautics and Astronautics
	43 Structures, Structural Dynamics, & Materials Award	American Institute of Aeronautics and Astronautics
	44 System Effectiveness and Safety	American Institute of Aeronautics and Astronautics
	45 Space Operations and Support Award	American Institute of Aeronautics and Astronautics
	46 Space Processing Award	American Institute of Aeronautics and Astronautics
	47 Lawrence Sperry Award	American Institute of Aeronautics and Astronautics
	48 Space Systems Award	American Institute of Aeronautics and Astronautics
	49 Space Science Award	American Institute of Aeronautics and Astronautics
	50 Support Systems Award	American Institute of Aeronautics and Astronautics
	51 Survivability Award	American Institute of Aeronautics and Astronautics
	52 Thermophysics Award	American Institute of Aeronautics and Astronautics
	53 F. E. Newbold V/STOL Award	American Institute of Aeronautics and Astronautics
	54 James A. Van Allen Space Environments Award	American Institute of Aeronautics and Astronautics
	55 Otto C. Winzen Lifetime Achievement Award	American Institute of Aeronautics and Astronautics
	56 James H. Wyld Propulsion Award	American Institute of Aeronautics and Astronautics
	57 Aerospace Software Engineering Award	American Institute of Aeronautics and Astronautics
	58 Information Systems Award	American Institute of Aeronautics and Astronautics
<b>Applied Mathematics</b>	1 John von Neumann Lectureship	Society for Industrial and Applied Mathematics
	2 Germund Dahlquist Prize	Society for Industrial and Applied Mathematics
	3 Richard C. DiPrima Prize	Society for Industrial and Applied Mathematics
	4 Ralph E. Kleinman Prize	Society for Industrial and Applied Mathematics
	5 George Polya Prize	Society for Industrial and Applied Mathematics
	6 W. T. and Idalia Reid Prize in Mathematics	Society for Industrial and Applied Mathematics
	7 Theodore von Karman Prize	Society for Industrial and Applied Mathematics
	8 James H. Wilkinson Prize in Numerical Analysis and Scientific Computing	Society for Industrial and Applied Mathematics
	9 SIAG/Analysis of Partial Differential Equations Prize	Society for Industrial and Applied Mathematics
	10 SIAG/Control and Systems Theory Prize	Society for Industrial and Applied Mathematics
	11 SIAG/Linear Algebra Prize	Society for Industrial and Applied Mathematics
	12 SIAG/Optimization Prize	Society for Industrial and Applied Mathematics

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	13	J. D. Crawford Prize (SIAG/Dynamical Systems)	Society for Industrial and Applied Mathematics
	14	Jurgen Moser Lecture	Society for Industrial and Applied Mathematics
	15	Bocher Memorial Prize	American Mathematical Society
<b>Astrophysics and Astronomy</b>			
	1	Newton Lacy Pierce Prize in Astronomy	American Astronomical Society
	2	Helen B. Warner Prize for Astronomy	American Astronomical Society
	3	Beatrice M. Tinsley Prize	American Astronomical Society
	4	Joseph Weber Award for Astronomical Instrumentation	American Astronomical Society
	5	Dannie Heineman Prize for Astrophysics	American Astronomical Society
	6	Annie J. Cannon Award in Astronomy	American Astronomical Society
	7	Klumpke-Roberts Award	Astronomical Society of the Pacific
	8	Robert J. Trumpler Award	Astronomical Society of the Pacific
	9	Maria and Eric Muhlmann Award	Astronomical Society of the Pacific
	10	Catherine Wolfe Bruce Gold Medal	Astronomical Society of the Pacific
<b>Biomedical Engineering and Bioengineering</b>			
	1	H. R. Lissner Medal	American Society of Mechanical Engineers
	2	Van C. Mow Medal	American Society of Mechanical Engineers
	3	Eli Lilly Award in Medical and Biological Engineering	Institute for Electrical and Electronics Engineers
	4	Paul R. Dawson Biotechnology Award*	American Association of Colleges of Pharmacy*
<b>Chemical Engineering</b>			
	1	Allan P. Colburn Award for Excellence in Publications by a Young Member of the Institute	American Institute of Chemical Engineers
	2	Alpha Chi Sigma Award for Chemical Engineering Research	American Institute of Chemical Engineers
	3	Award in Chemical Engineering Practice	American Institute of Chemical Engineers
	4	Founders Award for Outstanding Contributions to the Field of Chemical Engineering	American Institute of Chemical Engineers
	5	Professional Progress Award for Outstanding Progress in Chemical Engineering	American Institute of Chemical Engineers
	6	R. H. Wilhelm Award in Chemical Reaction Engineering	American Institute of Chemical Engineers
	7	William H. Walker Award for Excellence in Contributions to Chemical Engineering Literature	American Institute of Chemical Engineers
	8	Donald Q. Kern Award	American Institute of Chemical Engineers
<b>Chemical Engineering/ Chemistry</b>			
	1	Chemical Pioneer Award	American Institute of Chemists
	2	Percy L. Julian Award	National Organization for the Professional Advancement of Black Chemists and Chemical Engineers
	3	SCI Environment Award	Society of Chemical Industry
	4	SCI Innovation Award	Society of Chemical Industry
	5	SCI Society Award	Society of Chemical Industry
	6	Lloyd Ferguson Young Scientist Award*	National Organization for the Professional Advancement of Black Chemists and Chemical Engineers*

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
<b>Chemistry</b>	1	ACS Award for Computers in Chemical and Pharmaceutical Research	American Chemical Society
	2	ACS Award for Creative Advances in Environmental Science and Technology	American Chemical Society
	3	ACS Award for Creative Invention	American Chemical Society
	4	ACS Award for Creative Research and Applications of Iodine Chemistry (Presented biennially in odd-numbered years)	American Chemical Society
	5	ACS Award for Creative Work in Fluorine Chemistry	American Chemical Society
	6	ACS Award for Creative Work in Synthetic Organic Chemistry	American Chemical Society
	7	ACS Award for Team Innovation	American Chemical Society
	8	ACS Award in Analytical Chemistry	American Chemical Society
	9	ACS Award in Applied Polymer Science	American Chemical Society
	10	ACS Award in Chromatography	American Chemical Society
	11	ACS Award in Colloid and Surface Chemistry	American Chemical Society
	12	ACS Award in Industrial Chemistry	American Chemical Society
	13	ACS Award in Inorganic Chemistry	American Chemical Society
	14	ACS Award in Organometallic Chemistry	American Chemical Society
	15	ACS Award in Polymer Chemistry	American Chemical Society
	16	ACS Award in Pure Chemistry	American Chemical Society
	17	ACS Award in Separations Science and Technology	American Chemical Society
	18	ACS Award in the Chemistry of Materials	American Chemical Society
	19	ACS Award in Theoretical Chemistry	American Chemical Society
	20	Roger Adams Award in Organic Chemistry (Presented biennially in odd-numbered years)	American Chemical Society
	21	Alfred Bader Award in Bioinorganic or Bioorganic Chemistry	American Chemical Society
	22	Ronald Breslow Award for Achievement in Biomimetic Chemistry	American Chemical Society
	23	Herbert C. Brown Award for Creative Research in Synthetic Methods	American Chemical Society
	24	Alfred Burger Award in Medicinal Chemistry (Presented biennially in even-numbered years)	American Chemical Society
	25	Arthur C. Cope Award	American Chemical Society
	26	Arthur C. Cope Scholar Awards	American Chemical Society
	27	Elias J. Corey Award for Outstanding Original Contribution in Organic Synthesis by a Young Investigator	American Chemical Society
<b>Chemistry</b>	28	F. Albert Cotton Award in Synthetic Inorganic Chemistry	American Chemical Society
	29	Peter Debye Award in Physical Chemistry	American Chemical Society
	30	Frank H. Field and Joe L. Franklin Award for Outstanding Achievement in Mass Spectrometry	American Chemical Society
	31	Francis P. Garvan - John M. Olin Medal	American Chemical Society
	32	Ernest Guenther Award in the Chemistry of Natural Products	American Chemical Society

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	33	E.B. Hershberg Award for Important Discoveries in Medicinally Active Substances (Presented biennially in odd-numbered years)	American Chemical Society
	34	Joel Henry Hildebrand Award in the Theoretical and Experimental Chemistry of Liquids	American Chemical Society
	35	Ralph F. Hirschmann Award in Peptide Chemistry	American Chemical Society
	36	Claude S. Hudson Award in Carbohydrate Chemistry (Presented biennially in odd- numbered years)	American Chemical Society
	37	Ipatieff Prize (Presented every three years)	American Chemical Society
	38	Frederic Stanley Kipping Award in Silicon Chemistry (Presented biennially in even- numbered years)	American Chemical Society
	39	Irving Langmuir Award in Chemical Physics (Presented biennially in even-numbered years)	American Chemical Society
	40	E. V. Murphree Award in Industrial and Engineering Chemistry	American Chemical Society
	41	Nakanishi Prize (Presented biennially in odd-numbered years)	American Chemical Society
	42	James Flack Norris Award in Physical Organic Chemistry	American Chemical Society
	43	George A. Olah Award in Hydrocarbon or Petroleum Chemistry	American Chemical Society
	44	Charles Lathrop Parsons Award (Presented biennially in odd-numbered years)	American Chemical Society
	45	Glenn T. Seaborg Award for Nuclear Chemistry	American Chemical Society
	46	Gabor A. Somorjai Award for Creative Research in Catalysis	American Chemical Society
	47	E. Bright Wilson Award in Spectroscopy	American Chemical Society
	48	The Ahmed Zewail Award in Ultrafast Science and Technology	American Chemical Society
<b>Civil and Environmental Engineering</b>			
	1	Arid Lands Hydraulic Engineering Award	American Society of Civil Engineers
	2	Wallace Hayward Baker Award	American Society of Civil Engineers
	3	Harland Bartholomew Award	American Society of Civil Engineers
	4	Stephen D. Bechtel, Jr. Award	American Society of Civil Engineers
	5	Stephen D. Bechtel Pipeline Engineering Award	American Society of Civil Engineers
	6	John O. Bickel Award	American Society of Civil Engineers
	7	maurice A. Biot Medal	American Society of Civil Engineers
	8	Jack E. Cermak Medal	American Society of Civil Engineers
	9	Ven te Chow Award	American Society of Civil Engineers
	10	Collingwood Prize	American Society of Civil Engineers
	11	Computing in Civil Engineering Award	American Society of Civil Engineers
	12	Construction Management Award	American Society of Civil Engineers
	13	J. James R. Croes Medal	American Society of Civil Engineers
	14	Charles Martin Duke Lifeline Earthquake Engineering Award	American Society of Civil Engineers
	15	Hans Albert Einstein Award	American Society of Civil Engineers

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	16	Simon W. Freese Environmental Engineering Award and Lecture	American Society of Civil Engineers
	17	Alfred M. Freudenthal Medal	American Society of Civil Engineers
	18	Edmund Friedman Young Engineer Award for Professional Achievement	American Society of Civil Engineers
	19	Samuel Arnold Greeley Award	American Society of Civil Engineers
	20	Shortridge Hardesty Award	American Society of Civil Engineers
	21	Rudolph Hering Medal	American Society of Civil Engineers
	22	Karl Emil Hilgard Hydraulic Prize	American Society of Civil Engineers
	23	Julian Hinds Award	American Society of Civil Engineers
	24	Phillip R. Hoffman Award	American Society of Civil Engineers
	25	Hoover Medal	American Society of Civil Engineers
	26	Wesley W. Horner Award	American Society of Civil Engineers
	27	Robert Horonjeff Award	American Society of Civil Engineers
	28	Ernest E. Howard Award	American Society of Civil Engineers
	29	Walter L. Huber Civil Engineering Research Prizes	American Society of Civil Engineers
	30	Hydraulic Structures Medal	American Society of Civil Engineers
	31	Innovation in Civil Engineering Award	American Society of Civil Engineers
	32	International Coastal Engineering Award	American Society of Civil Engineers
	33	Martin S. Kapp Foundation Engineering Award	American Society of Civil Engineers
	34	James Laurie Prize	American Society of Civil Engineers
	35	T. Y. Lin Award	American Society of Civil Engineers
<b>Civil and Environmental Engineering</b>	36	Frank M. Masters Transportation Engineering Award	American Society of Civil Engineers
	37	Thomas A. Middlebrooks Award	American Society of Civil Engineers
	38	John G. Moffat-Frank E. Nichol Harbor and Coastal Engineering Award	American Society of Civil Engineers
	39	Moisseiff Award	American Society of Civil Engineers
	40	Walter P. Moore, Jr. Award	American Society of Civil Engineers
	41	Nathan M. Newmark Medal	American Society of Civil Engineers
	42	Alfred Noble Prize	American Society of Civil Engineers
	43	Norman Medal	American Society of Civil Engineers
	44	Ralph B. Peck Award	American Society of Civil Engineers
	45	Peurifoy Construction Research Award	American Society of Civil Engineers
	46	Harold R. Peyton Award for Cold Regions Engineering	American Society of Civil Engineers
	47	ASCE President's Medal	American Society of Civil Engineers
	48	Raymond C. Reese Research Prize	American Society of Civil Engineers
	49	Rickey Medal	American Society of Civil Engineers
	50	Roebing Award	American Society of Civil Engineers
	51	Hunter Rouse Hydraulic Engineering Lecture	American Society of Civil Engineers
	52	Thomas Fitch Rowland Prize	American Society of Civil Engineers
	53	Robert H. Scanlan Medal	American Society of Civil Engineers
	54	H. Bolton Seed Medal	American Society of Civil Engineers
	55	Wilbur S. Smith Award	American Society of Civil Engineers

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	56	Elmer A. Sperry Award	American Society of Civil Engineers
	57	ASCE State-of-the-Art of Civil Engineering Award	American Society of Civil Engineers
	58	J. C. Stevens Award	American Society of Civil Engineers
	59	Surveying and Mapping Award	American Society of Civil Engineers
	60	Karl Terzaghi Award	American Society of Civil Engineers
	61	Karl Terzaghi Lecture	American Society of Civil Engineers
	62	Royce J. Tipton Award	American Society of Civil Engineers
	63	Francis C. Turner Award	American Society of Civil Engineers
	64	Theodore von Karman Medal	American Society of Civil Engineers
	65	Arthur M. Wellington Prize	American Society of Civil Engineers
	66	Gene Wilhoite Innovations in Transmission Line Engineering Award	American Society of Civil Engineers
<b>Earth Sciences</b>			
	1	William Bowie Medal	American Geophysical Union
	2	James B. Macelwane Medal	American Geophysical Union
	3	Walter H. Bucher Medal	American Geophysical Union
	4	Robert E. Horton Medal	American Geophysical Union
	5	Harry H. Hess Medal	American Geophysical Union
	6	Charles A. Whitten Medal	American Geophysical Union
	7	Inge Lehmann Medal	American Geophysical Union
	8	William Gilbert Award	American Geophysical Union
	9	Penrose Medal	Geological Society of America
	10	Arthur L. Day Medal	Geological Society of America
	11	Young Scientist Award (Donath Medal)	Geological Society of America
	12	Subaru Outstanding Woman in Science Award	Geological Society of America
	13	John C. Frye Environmental Geology Award	Geological Society of America
	14	Paleontological Society Medal	Paleontological Society
	15	Charles Schuchert Award	Paleontological Society
	16	Harry Fielding Reid Medal	Seismological Society of America
	17	Charles F. Richter Early Career Award	Seismological Society of America
	18	Emil Truog Soil Science Award	Soil Science Society of America
	19	Don and Betty Kirkham Soil Physics Award	Soil Science Society of America
	20	Marion L. and Chrystie M. Jackson Soil Science Award	Soil Science Society of America
	21	Soil Science Applied Research Award	Soil Science Society of America
	22	Soil Science Research Award	Soil Science Society of America
<b>Electrical and Computer Engineering</b>			
	1	Eckert-Mauchly Award	Association for Computing Machinery
	2	Gordon Bell Prize	Association for Computing Machinery
	3	Grace Murray Hopper Award	Association for Computing Machinery
	4	Paris Kanellakis Theory and Practice Award	Association for Computing Machinery
	5	Eugene L. Lawler Award	Association for Computing Machinery
	6	Outstanding Contribution to ACM Award	Association for Computing Machinery
	7	Allen Newell Award	Association for Computing Machinery

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	8 ACM President Awards	Association for Computing Machinery
	9 SIAM/ACM Award in Computational Science and Engineering	Association for Computing Machinery
	10 Software System Award	Association for Computing Machinery
	11 A. M. Turing Award	Association for Computing Machinery
	12 Medal of Honor	Institute for Electrical and Electronics Engineers
	13 Alexander Graham Bell Medal	Institute for Electrical and Electronics Engineers
	14 Edison Medal	Institute for Electrical and Electronics Engineers
	15 Medal for Engineering Excellence	Institute for Electrical and Electronics Engineers
	16 Richard W. Hamming Medal	Institute for Electrical and Electronics Engineers
	17 Heinrich Hertz Medal	Institute for Electrical and Electronics Engineers
	18 Jack S. Kilby Signal Processing Medal	Institute for Electrical and Electronics Engineers
	19 Lamme Medal	Institute for Electrical and Electronics Engineers
	20 Wolfson James Clerk Maxwell Award	Institute for Electrical and Electronics Engineers
	21 Jun-ichi Nishizawa Medal	Institute for Electrical and Electronics Engineers
	22 Robert N. Noyce Medal	Institute for Electrical and Electronics Engineers
	23 Dennis J. Picard Medal for Radar Technologies & Applications	Institute for Electrical and Electronics Engineers
	24 Simon Ramo Medal	Institute for Electrical and Electronics Engineers
	25 John von Neumann Medal	Institute for Electrical and Electronics Engineers
	26 Cleo Brunetti Award	Institute for Electrical and Electronics Engineers
	27 Components, Packaging, and Manufacturing Technology Award	Institute for Electrical and Electronics Engineers
	28 Control Systems Award	Institute for Electrical and Electronics Engineers
	29 Electromagnetics Award	Institute for Electrical and Electronics Engineers
	30 James L. Flanagan Speech and Audia Processing Award	Institute for Electrical and Electronics Engineers
	31 Andrew S. Grove Award	Institute for Electrical and Electronics Engineers
	32 Herman Halperin Electric Transmission and Distribution Award	Institute for Electrical and Electronics Engineers
<b>Electrical and Computer Engineering</b>	33 Masaru Ibuka Consumer Electronics Award	Institute for Electrical and Electronics Engineers
	34 Award in International Communication	Institute for Electrical and Electronics Engineers
	35 Internet Award	Institute for Electrical and Electronics Engineers
	36 Reynold B. Johnson Data Storage Device Technology Award	Institute for Electrical and Electronics Engineers
	37 Reynold B. Johnson Information Storage Systems Award	Institute for Electrical and Electronics Engineers
	38 Richard Harold Kaufmann Award	Institute for Electrical and Electronics Engineers
	39 Joseph F. Kiethley Award in Instrumentation and Measurement	Institute for Electrical and Electronics Engineers
	40 Gustav Robert Kirchoff Award	Institute for Electrical and Electronics Engineers
	41 Koji Kobayashi Computers and Communications Award	Institute for Electrical and Electronics Engineers
	42 Morris E. Leeds Award	Institute for Electrical and Electronics Engineers
	43 Morris N. Liebmann Memorial Award	Institute for Electrical and Electronics Engineers
	44 Jack A Morton Award	Institute for Electrical and Electronics Engineers
	45 William E. Newell Power Electronics Award	Institute for Electrical and Electronics Engineers
	46 Daniel E. Noble Award	Institute for Electrical and Electronics Engineers

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	47	Frederik Philips Award	Institute for Electrical and Electronics Engineers
	48	Photonics Award	Institute for Electrical and Electronics Engineers
	49	Emanuel R. Piore Award	Institute for Electrical and Electronics Engineers
	50	Judith A. Resnik Award	Institute for Electrical and Electronics Engineers
	51	Robotics & Automation Award	Institute for Electrical and Electronics Engineers
	52	Frank Rosenblatt Award	Institute for Electrical and Electronics Engineers
	53	David Sarnoff Award	Institute for Electrical and Electronics Engineers
	54	Donald O. Pederson Award in Solid-State Circuits	Institute for Electrical and Electronics Engineers
	55	Charles Proteus Steinmetz Award	Institute for Electrical and Electronics Engineers
	56	Eric E. Sumner Award	Institute for Electrical and Electronics Engineers
	57	Nikola Tesla Award	Institute for Electrical and Electronics Engineers
	58	Kiyo Tomiyasu Award	Institute for Electrical and Electronics Engineers
	59	IEEE Medal of Honor	Institute of Electrical and Electronics Engineers
	60	IEEE Medals	Institute of Electrical and Electronics Engineers
<b>Electrical and Computer Engineering/ Chemical Engineering</b>			
	1	Edward Goodrich Acheson Award	Electrochemical Society
	2	Olin Palladium Award	Electrochemical Society
	3	Vittorio de Nora Award	Electrochemical Society
	4	Gordon E. Moore Medal for Outstanding Achievement in Solid State Science and Technology	Electrochemical Society
	5	Carl Wagner Memorial Award	Electrochemical Society
	6	Charles W. Tobias Young Investigator Award	Electrochemical Society
	7	Norman Hackerman Young Author Awards	Electrochemical Society
<b>Materials Science and Engineering</b>			
	1	Von Hippel Award	Materials Research Society
	2	David Thurnbull Lectureship	Materials Research Society
	3	MRS Medal	Materials Research Society
	4	Outstanding Young Investigator Award	Materials Research Society
	5	Nadai Medal	American Society of Mechanical Engineers
<b>Mathematics</b>			
	1	Frank Nelson Cole Prize in Algebra	American Mathematical Society
	2	Frank Nelson Cole Prize in Number Theory	American Mathematical Society
	3	Levi L. Conant Prize	American Mathematical Society
	4	Joseph L. Doob Prize	American Mathematical Society
	5	Delbert Ray Fulkerson Prize	American Mathematical Society
	6	E. H. Moore Research Article Prize	American Mathematical Society
	7	David P. Robbins Prize	American Mathematical Society
	8	Ruth Lyttle Satter Prize in Mathematics	American Mathematical Society
	9	Leroy P. Steele Prize for Lifetime Achievement	American Mathematical Society
	10	Leroy P. Steele Prize for Mathematical Exposition	American Mathematical Society
	11	Leroy P. Steele Prize for Seminal Contribution to Research	American Mathematical Society
	12	Oswald Veblen Prize in Geometry	American Mathematical Society



<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	13	Centennial Fellowships	American Mathematical Society
	14	Leonard Eisenbud Prize for Mathematics and Physics	American Mathematical Society
	15	Gerald C. Pomraning Award	American Nuclear Society
	16	Rolf Nevanlinna Prize	International Mathematical Union
	17	Gauss Prize medal	International Mathematical Union
	18	David P. Robbins Prize in Algebra, Combinatorics, and Discrete Mathematics	Mathematical Association of America
	19	Carl B. Allendoerfer Award	Mathematical Association of America
	20	Beckenbach Book Prize	Mathematical Association of America
	21	MAA-NAM David Blackwell Lectureship	Mathematical Association of America
	22	Chauvenet Prize	Mathematical Association of America
	23	Trevor Evans Award	Mathematical Association of America
	24	Lester R. Ford Award	Mathematical Association of America
	25	Earle Raymond Hedrick Lectureship	Mathematical Association of America
	26	George Polya Award	Mathematical Association of America
<b>Mechanical Engineering</b>	1	Bergles-Rohsenow Young Investigator Award in Heat Transfer	American Society of Mechanical Engineers
	2	Per Bruel Gold Medal for Noise Control and Acoustics	American Society of Mechanical Engineers
	3	Thomas A. Edison Patent Award	American Society of Mechanical Engineers
	4	Daniel C. Drucker Medal	American Society of Mechanical Engineers
	5	William T. Ennor Manufacturing Technology Award	American Society of Mechanical Engineers
	6	Fluids Engineering Award	American Society of Mechanical Engineers
	7	Melvin R. Green Codes & Standards Medal	American Society of Mechanical Engineers
	8	Heat Transfer Memorial Award	American Society of Mechanical Engineers
	9	Mayo D. Hersey Award	American Society of Mechanical Engineers
	10	Holley Medal	American Society of Mechanical Engineers
	11	Soichiro Honda Medal	American Society of Mechanical Engineers
	12	Internal Combustion Engine Award	American Society of Mechanical Engineers
	13	Warner T. Koiter Medal	American Society of Mechanical Engineers
	14	Frank Kreith Energy Award	American Society of Mechanical Engineers
	15	James N. Landis Medal	American Society of Mechanical Engineers
	16	Gustus L. Larson Memorial Award	American Society of Mechanical Engineers
	17	Machine Design Award	American Society of Mechanical Engineers
	18	Charles Russ Richards Memorial Award	American Society of Mechanical Engineers
	19	M. Eugene Merchant Manufacturing Medal of ASME/SME	American Society of Mechanical Engineers
	20	Burt L. Newkirk Award	American Society of Mechanical Engineers
	21	Old Guard Prizes	American Society of Mechanical Engineers
	22	Old Guard Early Career Award	American Society of Mechanical Engineers
	23	Rufus Oldenburger Medal	American Society of Mechanical Engineers
	24	Performance Test Codes Medal	American Society of Mechanical Engineers
<b>Mechanical Engineering</b>	25	Marshall B. Peterson Award	American Society of Mechanical Engineers
	26	Pi Tau Sigma Gold Medal	American Society of Mechanical Engineers

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	27	James Harry Potter Gold Medal	American Society of Mechanical Engineers
	28	Pressure Vessel and Piping Medal	American Society of Mechanical Engineers
	29	Dixy Lee Ray Award	American Society of Mechanical Engineers
	30	R. Tom Sawyer Medal	American Society of Mechanical Engineers
	31	J. Hall Taylor Medal	American Society of Mechanical Engineers
	32	Robert Henry Thurston Lecture Award	American Society of Mechanical Engineers
	33	Timoshenko Medal	American Society of Mechanical Engineers
	34	Yeram S. Touloukian Award	American Society of Mechanical Engineers
	35	George Westinghouse Medals	American Society of Mechanical Engineers
	36	Henry R. Worthington Medal	American Society of Mechanical Engineers
	37	Blackall Machine Tool and Gage Award	American Society of Mechanical Engineers
	38	Freeman Scholar Award	American Society of Mechanical Engineers
	39	Gas Turbine Award	American Society of Mechanical Engineers
	40	Henry Hess Award	American Society of Mechanical Engineers
	41	Melville Medal	American Society of Mechanical Engineers
	42	Edward F. Orbert Award	American Society of Mechanical Engineers
	43	Prime Movers Committee Award	American Society of Mechanical Engineers
	44	Worcester Reed Warner Medal	American Society of Mechanical Engineers
	45	Arthur L. Williston Medal	American Society of Mechanical Engineers
<b>Oceanography and Atmospheric Sciences and Meteorology</b>			
	1	Maurice Ewing Medal	American Geophysical Union
	2	The Jule G. Charney Award	American Meteorological Society
	3	The Verner E. Suomi Award	American Meteorological Society
	4	The Sverdrup Gold Medal	American Meteorological Society
	5	The Henry Stommel Research Award	American Meteorological Society
	6	The Remote Sensing Prize	American Meteorological Society
	7	The Clarence Leroy Meisinger Award	American Meteorological Society
	8	The Henry G. Houghton Award	American Meteorological Society
	9	The Nicholas P. Fofonoff Award	American Meteorological Society
	10	The Francis W. Reichelderfer Award	American Meteorological Society
	11	The Award for Outstanding Contribution to the Advance of Applied Meteorology	American Meteorological Society
	12	The Award for Outstanding Achievement in Biometeorology	American Meteorological Society
	13	The Helmut E. Landsberg Award	American Meteorological Society
	14	Special Awards	American Meteorological Society
	15	The Banner I. Miller Award	American Meteorological Society
<b>Operations Research, Systems Engineering and Industrial Engineering</b>			
	1	Frederick W. Lanchester Prize	Institute for Operations Research and the Management Sciences
	2	Phillip McCord Morse Lectureship Award	Institute for Operations Research and the Management Sciences
	3	John von Neumann Theory Prize	Institute for Operations Research and the Management Sciences
	4	David F. Baker Distinguished Research Award	Institute of Industrial Engineers

<b>TAXONOMIC FIELD</b>	<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	5 Award for Technical Innovation in Industrial Engineering	Institute of Industrial Engineers
	6 Medallion Award	Institute of Industrial Engineers
<b>Physics</b>		
	1 Dirac Medal	Abdus Salam International Centre for Theoretical Physics
	2 Dannie Heineman Mathematical Physics Prize	American Institute of Physics
	3 Fluid Dynamics Prize	American Institute of Physics
	4 Science Writing Awards	American Institute of Physics
	5 Aneesur Rahman Prize for Computational Physics	American Physical Society
	6 Arthur L. Schawlow Prize in Laser Science	American Physical Society
	7 Dannie Heineman Prize for Mathematical Physics	American Physical Society
	8 Davisson-Germer Prize in Atomic or Surface Physics	American Physical Society
	9 Earle K. Plyler Prize for Molecular Spectroscopy	American Physical Society
	10 Einstein Prize	American Physical Society
	11 Fluid Dynamics Prize	American Physical Society
	12 Frank Isakson Prize for Optical Effects in Solids	American Physical Society
	13 George E. Valley, Jr. Prize	American Physical Society
	14 Hans A. Bethe Prize	American Physical Society
	15 Herbert P. Broida Prize	American Physical Society
	16 I.I. Rabi Prize in Atomic, Molecular and Optical Physics	American Physical Society
	17 Irving Langmuir Prize in Chemical Physics	American Physical Society
	18 J. J. Sakurai Prize for Theoretical Particle Physics	American Physical Society
	19 James C. McGroddy Prize for New Materials	American Physical Society
	20 James Clerk Maxwell Prize for Plasma Physics	American Physical Society
	21 Julius Edgar Lilienfeld Prize	American Physical Society
	22 Lars Onsager Prize	American Physical Society
<b>Physics</b>	23 Max Delbruck Prize in Biological Physics	American Physical Society
	24 Oliver E. Buckley Condensed Matter Prize	American Physical Society
	25 Polymer Physics Prize	American Physical Society
	26 Robert R. Wilson Prize for Achievement in the Physics of Particle Accelerators	American Physical Society
	27 Tom W. Bonner Prize in Nuclear Physics	American Physical Society
	28 W.K.H. Panofsky Prize in Experimental Particle Physics	American Physical Society
	29 Will Allis Prize for the Study of Ionized Gases	American Physical Society
	30 David Adler Lectureship Award in the Field of Materials Physics	American Physical Society
	31 Francis M. Pipkin Award	American Physical Society
	32 John Dawson Award for Excellence in Plasma Physics Research	American Physical Society
	33 John H. Dillon Medal	American Physical Society
	34 Joseph F. Keithley Award For Advances in Measurement Science	American Physical Society
	35 Maria Goeppert Mayer Award	American Physical Society
	36 Otto Laporte Award (last awarded in 2003)	American Physical Society

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	37	Shock Compression Science Award	American Physical Society
	38	The Boltzmann Award	International Union of Pure and Applied Physics (IUPAP) Commission on Statistical Physics
	39	OSA Fellowship*	Optical Society of America*
	40	Frederic Ives Medal/Jarus W. Quinn Endowment	Optical Society of America
	41	Max Born Award	Optical Society of America
	42	Joseph Fraunhofer Award/Robert M. Burley Prize	Optical Society of America
	43	Engineering Excellence Award	Optical Society of America
	44	The Joseph W. Goodman Book Writing Award	Optical Society of America
	45	Nich Holonyak Jr. Award	Optical Society of America
	46	Leadership Award/New Focus Prize	Optical Society of America
<b>Physics</b>	47	Emmett N. Leith Medal	Optical Society of America
	48	Ellis R. Lippincott Award	Optical Society of America
	49	Adolph Lomb Medal	Optical Society of America
	50	C.E.K. Mees Medal	Optical Society of America
	51	William F. Meggers Award	Optical Society of America
	52	David Richardson Medal	Optical Society of America
	53	Edgar D. Tillyer Award	Optical Society of America
	54	Charles Hard Townes Award	Optical Society of America
	55	John Tyndall Award	Optical Society of America
	56	R. W. Wood Prize	Optical Society of America
<b>Statistics and Probability</b>			
	1	Wilks Memorial Award	American Statistical Association
	2	Gottfried E. Noether Awards	American Statistical Association
	3	Outstanding Statistical Application Award	American Statistical Association
	4	W. J. Youden Award in Interlaboratory Testing	American Statistical Association
	5	SPAIG Award	American Statistical Association
	6	Statistics in Chemistry Award	American Statistical Association
<b>Emerging Fields</b>			
<b>Information Science</b>	1	Best Information Science Book	American Society for Information Science and Technology
	2	John Wiley Best JAS/ST Paper	American Society for Information Science and Technology
	3	Research in Information Science Award	American Society for Information Science and Technology
<b>Nuclear Engineering</b>			
	1	Cisler Medal	American Nuclear Society
	2	Ray Goertz Award	American Nuclear Society
	3	ESD Award for Sustainable Energy and Development	American Nuclear Society
	4	Fellow of ANS	American Nuclear Society
	5	Landis Young Member Engineering Achievement Award	American Nuclear Society
	6	George C. Laurence Pioneering Award	American Nuclear Society
	7	Mishima Award	American Nuclear Society
	8	Radiation Science and Technology	American Nuclear Society
	9	Reactor Technology Award	American Nuclear Society

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	10	Rockwell Lifetime Achievement Award	American Nuclear Society
	11	Seaborg Medal	American Nuclear Society
	12	Special Award	American Nuclear Society
	13	Technical Achievement Award	American Nuclear Society
	14	Edward Teller Award	American Nuclear Society
	15	Theos J. ("Tommy") Thompson Award	American Nuclear Society
	16	Samuel Untermyer II Award	American Nuclear Society
	17	Eugene P. Wigner Reactor Physicist Award	American Nuclear Society
	18	Walter H. Zinn Award	American Nuclear Society
	19	Presidential Citation	American Nuclear Society
<b>Multidisciplinary</b>			
	1	Gold Medal	Acoustical Society of America
	2	Honorary Fellows	Acoustical Society of America
	3	von Bekesy Medal	Acoustical Society of America
	4	Silver Medal	Acoustical Society of America
	5	National Engineering Award	American Association of Engineering Societies
	6	Kenneth Andrew Roe Award	American Association of Engineering Societies
	7	John Fritz Medal	American Association of Engineering Societies
	8	Space Flight Award	American Astronautical Society
	9	Melbourne W. Boynton Award	American Astronautical Society
	10	Eugene M. Emme Award	American Astronautical Society
	11	Carl Sagan Memorial Award	American Astronautical Society
	12	John Adam Fleming Medal	American Geophysical Union
	13	Roger Revelle Medal	American Geophysical Union
	14	Gold Medal Award	American Institute of Chemists
	15	Sloan Research Fellowship	Alfred P. Sloan Foundation
	16	Beckman Young Investigators (BYI)	Arnold and Mabel Beckman Foundation
	17	Fulbright Awards	Council for International Exchange of Scholars
	18	Packard Fellowship for Science and Engineering	David and Lucile Packard Foundation
	19	Presidential Early Career Awards for Scientists and Engineers (PECASE)	National Science Foundation
	20	Searle Scholar	Searle Scholars Program
	21	Pew Scholars in the Biomedical Sciences	The Pew Charitable Trusts
	22	Distinguished Young Scholars in Medical Research Program*	W.M. Keck Foundation*
	23	Anniversary Fellows Program	Institute of Medicine, National Academies
	24	NAED Members	National Academy of Education
	25	NAED Fellowship	National Academy of Education
Total =	510		

<b>Awards in the Social and Behavioral Sciences</b>			
<b>HIGHLY PRESTIGIOUS</b>			<i>* data not available</i>
<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Multidisciplinary</b>	1	MacArthur Fellow	MacArthur Foundation
	2	Nobel Peace Prize	Nobel Foundation
	3	Fellow Status	Harvard Society of Fellows
	4	National Academy of Sciences Member	National Academy of Sciences
	5	National Academy of Engineering Member	National Academy of Engineering
	6	Institute of Medicine Member	Institute of Medicine
	7	Woodrow Wilson Fellowship	Woodrow Wilson International Center for Scholars
	8	Guggenheim Fellowship	John Simon Guggenheim Memorial Foundation
	9	Talcott Parsons Prize	American Academy of Arts and Sciences
	10	The Founders Award	American Academy of Arts and Sciences
	11	American Academy of Arts and Sciences Member	American Academy of Arts and Sciences
	12	John Frederick Lewis Award	American Philosophical Society
	13	Thomas Jefferson Medal for Distinguished Achievement in the Arts, Humanities, or Social Sciences	American Philosophical Society
	14	Sabbatical Fellowships	American Philosophical Society
	15	American Philosophical Society Member	American Philosophical Society
	16	Benjamin Franklin Medal	American Philosophical Society
	17	John Bates Clark Medal	American Economic Association
	18	The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel	Nobel Foundation
	19	Crafoord Prize	Royal Swedish Academy of Science
	20	Wolf Prize	Wolf Foundation
	21	Member of National Academy of Education	National Academy of Education
	22	Fellow of National Academy of Public Administration	National Academy of Public Administration
	23	National Medal of Science	National Science Foundation
	24	Gold Medal Award for Life Achievement in the Science of Psychology	American Psychological Association
<b>Highly Prestigious Total =</b>	<b>24</b>		
<b>Awards in the Social and Behavioral Sciences</b>			
<b>PRESTIGIOUS</b>			<i>* data not available</i>
<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Agricultural and Resource Economics</b>	1	Quality of Research Discovery	American Agricultural Economics Association
	2	Outstanding Journal Article (ending 1998)	American Agricultural Economics Association
	3	Outstanding <i>American Journal of Agricultural Economics</i> Article	American Agricultural Economics Association
	4	Outstanding <i>Review of Agricultural Economics</i> Article	American Agricultural Economics Association

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	5	Outstanding <i>Choices</i> Article	American Agricultural Economics Association
	6	Publication of Enduring Quality	American Agricultural Economics Association
	7	Fellowships	American Agricultural Economics Association
<b>Anthropology</b>			
	1	AAA President's Award	American Anthropological Association
	2	Distinguished Lecture Award	American Anthropological Association
	3	Alfred Vincent Kidder Award for Eminence in the Field of American Archaeology	American Anthropological Association
	4	Robert B Textor and Family Prize for Excellence in Anticipatory Anthropology	American Anthropological Association
	5	Solon T Kimball Award for Public and Applied Anthropology	American Anthropological Association
	6	Margaret Mead Award	American Anthropological Association/ Society for Applied Anthropology
	7	Lourdes Arizpe Award	American Anthropological Association
	8	W. W. Howells Book Award*	American Anthropological Association*
	9	Gordon R Willey Prize	American Anthropological Association
	10	Morton H. Fried Prize*	American Anthropological Association*
	11	P. E. MacAllister Field Archaeology Award	American Schools of Oriental Research
	12	G. Ernest Wright Award	American Schools of Oriental Research
	13	The Charles R Darwin Lifetime Achievement Award	American Association of Physical Anthropologists
	14	Edward Sapir Prize	Society for Linguistic Anthropology
	15	SPA Lifetime Achievement Award	Society for Psychological Anthropology
<b>Communication</b>			
	1	Steven H. Chaffee Career Productivity Award	International Communication Association
	2	Outstanding Book Award	International Communication Association
	3	Applied/Public Policy Research Award	International Communication Association
	4	Outstanding Article Award	International Communication Association
	5	Young Scholar Award	International Communication Association
	6	ICA Fellows Book Award	International Communication Association
	7	Karl R. Wallace Memorial Award	National Communication Association
	8	Samuel L. Becker Distinguished Service Award	National Communication Association
	9	Bernard J. Brommel Award for Outstanding Scholarship or Distinguished Service in Family Communication	National Communication Association
	10	Douglas W. Ehninger Distinguished Rhetorical Scholar Award	National Communication Association
	11	Franklyn S. Haiman Award for Distinguished Scholarship in Freedom of Expression	National Communication Association
	12	Gerald M. Phillips Award for Distinguished Applied Communication Scholarship	National Communication Association
	13	Leslie Irene Coger Award for Distinguished Performance	National Communication Association
	14	Lilla A. Heston Award for Outstanding Scholarship in Interpretation and Performance Studies	National Communication Association
	15	Charles H. Woolbert Research Award	National Communication Association

<u>TAXONOMIC FIELD</u>		<u>AWARD NAME</u>	<u>GRANTING ORGANIZATION</u>
	16	James A. Winans - Herbert A. Wichelns Memorial Award for Distinguished Scholarship in Rhetoric and Public Address	National Communication Association
	17	Golden Anniversary Monograph Awards	National Communication Association
	18	Diamond Book Anniversary Award	National Communication Association
	19	Distinguished Scholar Award	National Communication Association
<b>Economics</b>	1	Elaine Bennett Research Prize	Committee on the Status of Women in the Economics Profession
	2	Carolyn Shaw Bell Award	Committee on the Status of Women in the Economics Profession
<b>Geography</b>	1	Honorary Fellowship	American Geographical Society
	2	Cullum Geographical Medal	American Geographical Society
	3	Charles P. Daly Medal	American Geographical Society
	4	Samuel Finley Breese Morse Medal	American Geographical Society
	5	David Livingstone Centenary Medal	American Geographical Society
	6	George Davidson Medal	American Geographical Society
	7	Osborn Maitland Miller Medal	American Geographical Society
	8	Van Cleef Memorial Medal	American Geographical Society
	9	Paul P. Vouras Medal	American Geographical Society
	10	Wrigley-Fairchild Prize	American Geographical Society
	11	J. B. Jackson Prize	Association of American Geographers
	12	AAG Globe Award	Association of American Geographers
	13	AAG Meridian Award	Association of American Geographers
	14	AAG Honors	Association of American Geographers
	15	James R. Anderson Medal of Honor in Applied Geography	Association of American Geographers
	16	AAG Honorary Geographer	Association of American Geographers
	17	Glenda Laws Award*	Association of American Geographers*
	18	Meredith F. Burrill Award	Association of American Geographers
	19	AAG E. Willard and Ruby S. Miller Award in Geography*	Association of American Geographers*
	20	J. Warren Nystrom Award*	Association of American Geographers*
<b>Linguistics</b>	1	Leonard Bloomfield Book Award	Linguistic Society of America
	2	Linguistics, Language, and the Public Award	Linguistic Society of America
	3	Kenneth L. Hale Award	Linguistic Society of America
	4	Victoria A. Fromkin Lifetime Service Award	Linguistic Society of America
<b>Multidisciplinary</b>	1	Bashorun M K O Abiola Lecture	African Studies Association
	2	Claude Ake Award (ended 2004)	African Studies Association
	3	Conover-Porter Award	African Studies Association
	4	Distinguished Africanist Award	African Studies Association
	5	Herskovits Award	African Studies Association



<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	6	Paul Hair Prize*	African Studies Association*
	7	Distinguished Contributions to Slavic Studies Award	American Association for the Advancement of Slavic Studies
	8	Wayne S. Vucinich Book Prize	American Association for the Advancement of Slavic Studies
	9	Barbara Jelavich Book Prize	American Association for the Advancement of Slavic Studies
	10	AAASS/ Orbis Books Prize for Polish Studies	American Association for the Advancement of Slavic Studies
	11	W. Bruce Lincoln Book Prize	American Association for the Advancement of Slavic Studies
	12	Marshall Shulman Book Prize	American Association for the Advancement of Slavic Studies
	13	AAUW Achievement Award	American Association of University Women
	14	AAUW Recognition Award for Emerging Scholars	American Association of University Women
	15	Founders Distinguished Senior Scholar Award	American Association of University Women
	16	American Fellowships*	American Association of University Women*
	17	Eleanor Roosevelt Fund Award*	American Association of University Women*
	18	Women of Distinction Award	American Association of University Women
	19	Jonas C. Greenfield Prize for Younger Scholars	American Oriental Society
	20	AAS Award for Distinguished Contributions to Asian Studies	Association for Asian Studies
	21	AAS CIAC Levenson Prizes for Books in Chinese Studies (2 categories)	Association for Asian Studies
	22	AAS NEAC John Whitney Hall Book Prize (Japan or Korea)	Association for Asian Studies
	23	AAS SAC Ananda Kentish Coomaraswamy Book Prize (South Asia)	Association for Asian Studies
	24	AAS SEAC Harry J. Benda Prize (Southeast Asia)	Association for Asian Studies
	25	Franklin R. Buchanan Prize	Association for Asian Studies
	26	AAS A K Ramanujan Book Prize for Translation	Association for Asian Studies
	27	Cahnman Publication Subvention Grants*	Association for Jewish Studies*
	28	AABS Book Prize*	Association for the Advancement of Baltic Studies*
	29	Vilis Vitols Prize*	Association for the Advancement of Baltic Studies*
	30	CCK Distinguished Fellowships	Chiang Ching-Kuo Distinguished Fellowships
	31	CCK Scholar and Research Grants	Chiang Ching-Kuo Distinguished Fellowships
	32	CCK Visiting Fellowships	Chiang Ching-Kuo Distinguished Fellowships
	33	DAAD Book Prize of the GSA*	German Studies Association*
	34	Sybil Halpern Milton Memorial Book Prize*	German Studies Association*
	35	DAAD Article Prize of the GSA*	German Studies Association*
	36	Robert W. Kleemeier Award	The Gerontological Society of America
	37	M. Powell Lawton Award	The Gerontological Society of America
	38	Maxwell A. Pollock Award for Productive Aging	The Gerontological Society of America
	39	Distinguished Career Contribution to Gerontology Award	The Gerontological Society of America
	40	Richard Kalish Innovative Publication Award	The Gerontological Society of America
	41	Grawemeyer Awards	Grawemeyer Foundation
	42	An Wang Fellowship	Harvard Fairbank Center for East Asian Research
	43	Visiting Member Awards-School of Social Science	Institute for Advanced Study
	44	Kalman Silvert Award*	Latin American Studies Association*
	45	Bryce Wood Book Award*	Latin American Studies Association*
	46	Premio Iberoamericano Award*	Latin American Studies Association*
	47	Media Award*	Latin American Studies Association*

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
	48	Martin Diskin Memorial Lectureship*	Latin American Studies Association*
	49	Albert Hourani Book Award	Middle East Studies Association
	50	MESA Academic Freedom Award	Middle East Studies Association
	51	SSRC Abe Fellows	Social Science Research Council
	52	John Desmond Bernal Prize	Society for the Social Studies of Science
	53	Ludwick Fleck Prize	Society for the Social Studies of Science
	54	Rachel Carson Prize	Society for the Social Studies of Science
	55	American Association for the Advancement of Science Fellow	American Association for the Advancement of Science
	56	Radcliffe Fellows	Radcliffe Institute
<b>Political Science</b>			
	1	Hubert H. Humphrey Award	American Political Science Association
	2	Woodrow Wilson Foundation Award	American Political Science Association
	3	James Madison Award	American Political Science Association
	4	Benjamin E. Lippincott Award	American Political Science Association
	5	Ithiel de Sola Pool Award	American Political Science Association
	6	Ralph J. Bunche Award	American Political Science Association
	7	Franklin L. Burdette/ Pi Sigma Alpha Award	American Political Science Association
	8	Frank Goodnow Award	American Political Science Association
	9	John Gaus Award	American Political Science Association
	10	Gladys M. Kammerer	American Political Science Association
	11	Charles Merriam Award	American Political Science Association
	12	Karl Deutsch Award	International Studies Association
	13	International Studies Book of the Decade Award	International Studies Association
	14	International Studies Best Book Award	International Studies Association
<b>Psychology</b>			
	1	Distinguished Scientific Contribution Awards	American Psychological Association
	2	Fellow Status*	American Psychological Association*
	3	Theodore Millon Mid-Career Award in Personality Psychology	American Psychological Association
	4	Wilhelm Wundt-William James Award for Exceptional Contributions to Trans-Atlantic Psychology	American Psychological Association
	5	Award for Distinguished Scientific Applications of Psychology	American Psychological Association
	6	Award for Distinguished Scientific Early Career Contribution to Psychology	American Psychological Association
	7	William James Fellow Award	American Psychological Society
	8	James McKeen Cattell Fellow Award	American Psychological Society
	9	William James Distinguished Lectures in Psychological Science	American Psychological Society
	10	APS Fellows	American Psychological Society
	11	James McKeen Cattell Fund Fellowship	American Psychological Society
	12	D. O. Hebb Distinguished Scientific Contributions Award	Division of Behavioral Neuroscience and Comparative Psychology
	13	Samuel J. Messick Distinguished Scientific Contributions Award	Division of Evaluation, Measurement, and Statistics

<b>TAXONOMIC FIELD</b>		<b>AWARD NAME</b>	<b>GRANTING ORGANIZATION</b>
<b>Public Affairs, Public Policy and Public Administration</b>	1	AERA Award for Disntinguished Contributions to Research in Education	American Educational Research Association
	2	Palmer O. Johnson Memorial Award	American Educational Research Association
	3	Review of Research Award	American Educational Research Association
	4	E. F. Lindquist Award	American Educational Research Association
	5	Early Career Award	American Educational Research Association
	6	Outstanding Book Award	American Educational Research Association
	7	Scholars of Color Distinguished Career Contribution Award	American Educational Research Association
	8	Scholars of Color Distinguished Scholar Award	American Educational Research Association
	9	Scholars of Color Early Career Contribution Award	American Educational Research Association
<b>Sociology</b>	1	Distinguished Book Award	American Sociological Association
	2	Distinguished Career Award for the Practice of Sociology	American Sociological Association
	3	Jessie Bernard Award	American Sociological Association
	4	Cox-Johnson-Frazier Award	American Sociological Association
	5	W. E. B. DuBois Career of Distinguished Scholarship Award	American Sociological Association
	6	Sorokin Award	American Sociological Association
	7	Stouffer Award	American Sociological Association
	8	Sydney Spivack Award	American Sociological Association
	9	Clifford C. Clogg Award for Early Career Achievement	Population Association of America
	10	Mindel C. Sheps Award	Population Association of America
	11	Irene B. Taeuber Award	Population Association of America
	12	Robert J. Lapham Award	Population Association of America
	13	C. Wright Mills Award	Society for the Study of Social Problems
	14	Lee Founders Award	Society for the Study of Social Problems
<b>Criminology and Criminal Justice</b>	1	Edwin H. Sutherland Award	American Society of Criminology
	2	August Vollmer Award	American Society of Criminology
	3	Sellin-Glueck Award	American Society of Criminology
	4	Ruth Shonle Cavan Young Scholar Award	American Society of Criminology
	5	Michael J. Hindelang Award	American Society of Criminology
	6	President's Award for Distinguished Contributions to Justice	American Society of Criminology
<b>Prestigious Total =</b>	<b>179</b>		

## PRESTIGIOUS AWARD WINNERS AT WSU

*Identified via Self-Reported Data - List of NRC (AAU)*

Nehal Abu-Lail, *Chemical Engineering & Bioengineering*  
Fulbright Award, Council for International Exchange of Scholars

Arreed Barabasz, *Educational Leadership, Sport Studies, and Educational/Counseling Psychology*  
Fellow, American Psychological Association

Marianne Barabasz, *Educational Leadership, Sport Studies, and Educational/Counseling Psychology*  
Fellow, American Psychological Association

Peter Boag, *History*  
Fulbright Award, Council for International Exchange of Scholars

Anjan Bose, *School of Electrical Engineering and Computer Science*  
Member, National Academy of Engineering

Susmita Bose, *School of Mechanical and Materials Engineering*  
Presidential Early Career Award for Scientists and Engineers (PECASE)  
National Science Foundation

Jade D'Alpoim Guedes, *Anthropology*  
ACLS Fellowship, American Council of Learned Societies

Linda Eddy, *WSU Vancouver, College of Nursing*  
Fulbright Award, Council for International Exchange of Scholars

Michael Griswold, *School of Molecular Biosciences*  
Fellow, American Association for the Advancement of Science

John Harrison, *WSU Vancouver, School of the Environment*  
Sustainability Science Award, Ecological Society of America

John Hirth, *School of Mechanical and Materials Engineering*  
Member, National Academy of Engineering

Scot Hulbert, *Plant Pathology*  
Fellow, American Phytopathological Society

Dennis Johnson, *Plant Pathology*  
Fellow, American Phytopathological Society

Norman Lewis, *Institute of Biological Chemistry*  
Fellow, American Society of Plant Biologists

Terry McElwain, *Paul G. Allen School for Global Animal Health*  
Member, National Academy of Sciences

**Prestigious Award Winners at WSU** *continued*

John McNamara, *Animal Sciences*  
Corbin Companion Animal Biology Award, American Society of Animal Science

Brian McNeill, *Educational Leadership, Sport Studies, and Educational, Counseling Psychology*  
Fellow, American Psychological Association

Sinisa Mesarovic, *School of Mechanical and Materials Engineering*  
Fulbright Award, Council for International Exchange of Scholars

James Moyer, *Agricultural Research Center*  
Fellow, American Phytopathological Society

Tim Murray, *Plant Pathology*  
Fellow, American Phytopathological Society

Guy Palmer, *Paul G. Allen School for Global Animal Health*  
Member, National Academy of Sciences

Susan Peabody, *WSU Vancouver, History*  
ACLS Fellowships, American Council of Learned Societies

Thomas Spencer, *Animal Sciences*  
Animal Physiology and Endocrinology Award, American Society of Animal Science

Matthew Sutton, *History*  
National Endowment for the Humanities Fellowship, National Endowment for the Humanities

Juming Tang, *Biological Systems Engineering*  
FPSA-FPEI Food Engineering Award, American Society of Agricultural and Biological Engineers

Juming Tang, *Biological Systems Engineering*  
Research and Development Award, Institute of Food Technologists

Susan Wang, *School of Molecular Biosciences*  
Faculty Early Career Development (CAREER) Award, National Science Foundation

**WSU Full-time Tenured and Tenure-Track Instructional Faculty**  
**Spring 2014 High, Low, Mean and Median 9-Month Salaries**  
 By Area, Department and Rank

Updated salary data for internal use, using criteria from the Oklahoma State Salary Survey. Survey criteria are listed in the footnotes.

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
College of Agricultural Human & Natural Res Sci		Professor	76	64,743	213,000	115,858	107,135	\$97,055
		Associate Prof	61	56,841	144,450	81,554	73,823	
		Assistant Prof	31	54,106	109,203	81,462	83,200	
		<i>New Assistant</i>	2	68,640	89,750	79,195	79,195	
School of Economic Sciences 1150	45.0601	Professor	11	89,440	182,000	132,323	135,818	\$117,298
		Associate Prof	4	96,000	114,400	101,220	97,240	
		Assistant Prof	6	88,280	109,203	100,471	102,130	
		<i>New Assistant</i>	0					
Biological Systems Engineering 1170	14.0301	Professor	5	114,519	197,231	168,259	187,036	\$123,288
		Associate Prof	4	77,715	118,344	100,745	103,460	
		Assistant Prof	4	83,200	96,982	89,618	89,146	
		<i>New Assistant</i>	0					
Crop and Soil Sciences 1200	1.1102	Professor	12	75,976	145,053	111,776	110,722	\$98,705
		Associate Prof	7	56,841	100,639	83,144	89,280	
		Assistant Prof	5	64,669	104,809	89,122	103,745	
		<i>New Assistant</i>	1	68,640	68,640	68,640	68,640	
Animal Sciences 1240	1.0901	Professor	8	64,743	179,300	106,612	99,542	\$99,111
		Associate Prof	5	61,053	103,367	87,110	92,332	
		Assistant Prof	0					
		<i>New Assistant</i>	0					
Entomology 1840	26.0702	Professor	9	69,338	115,882	91,483	89,701	\$84,852
		Associate Prof	4	68,169	79,560	71,394	68,924	
		Assistant Prof	1	79,000	79,000	79,000	79,000	
		<i>New Assistant</i>	0					
School of Food Science 1960	1.1001	Professor	4	83,098	126,976	106,717	108,397	\$90,384
		Associate Prof	2	73,823	80,682	77,252	77,252	
		Assistant Prof	2	63,818	77,880	70,849	70,849	
		<i>New Assistant</i>	0					
Human Development 8345	19.0701	Professor	0					\$66,678
		Associate Prof	9	63,051	72,551	67,221	66,871	
		Assistant Prof	3	58,640	72,720	65,047	63,780	
		<i>New Assistant</i>	0					
Horticulture 2210	1.1103	Professor	6	73,674	160,000	105,726	97,234	\$94,110
		Associate Prof	9	64,530	119,127	88,986	78,284	
		Assistant Prof	1	70,527	70,527	70,527	70,527	
		<i>New Assistant</i>	0					

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
Apparel Merch Design & Text 1600	19.0901	Professor	2	85,470	90,179	87,824	87,824	\$78,832
		Associate Prof	2	72,319	78,596	75,457	75,457	
		Assistant Prof	1	67,600	67,600	67,600	67,600	
		<i>New Assistant</i>	<i>0</i>					
Sch of Design & Const-CAHNRS 8708	50.0408	Professor	0					\$66,506
		Associate Prof	3	69,197	70,470	69,854	69,895	
		Assistant Prof	2	60,780	62,186	61,483	61,483	
		<i>New Assistant</i>	<i>0</i>					
Sch of the Environment-CAHNRS 1990	3.0101	Professor	4	92,942	100,667	96,870	96,936	\$76,893
		Associate Prof	7	60,592	78,816	67,248	65,283	
		Assistant Prof	1	64,500	64,500	64,500	64,500	
		<i>New Assistant</i>	<i>0</i>					
Plant Pathology 2810	26.0305	Professor	10	81,606	116,181	96,975	101,521	\$86,415
		Associate Prof	2	61,312	68,915	65,113	65,113	
		Assistant Prof	2	54,106	55,734	54,920	54,920	
		<i>New Assistant</i>	<i>0</i>					
Institute of Biological Chem 1140	26.0308	Professor	3	176,526	213,000	199,595	209,258	\$139,824
		Associate Prof	3	93,660	144,450	113,990	103,860	
		Assistant Prof	2	88,083	89,750	88,917	88,917	
		<i>New Assistant</i>	<i>1</i>	89,750	89,750	89,750	<i>89,750</i>	
<b>Voiland College of Engineering and Architecture</b>		<b>Professor</b>	<b>50</b>	<b>75,106</b>	<b>262,277</b>	<b>134,104</b>	<b>129,254</b>	\$108,541
		<b>Associate Prof</b>	<b>38</b>	<b>62,461</b>	<b>115,450</b>	<b>93,269</b>	<b>94,762</b>	
		<b>Assistant Prof</b>	<b>29</b>	<b>53,966</b>	<b>103,999</b>	<b>84,477</b>	<b>85,536</b>	
		<i>New Assistant</i>	<i>4</i>	<i>79,040</i>	<i>88,400</i>	<i>83,980</i>	<i>84,240</i>	
School of Design & Const, CEA 1260	4.0201	Professor	4	75,106	132,184	92,736	81,828	\$79,174
		Associate Prof	7	62,461	97,813	75,025	70,000	
		Assistant Prof	1	53,966	53,966	53,966	53,966	
		<i>New Assistant</i>	<i>0</i>					
Chemical Engr & Bioengr 1520	14.0701	Professor	6	91,997	197,600	152,075	155,532	\$118,519
		Associate Prof	7	84,515	115,450	101,808	105,040	
		Assistant Prof	3	88,400	91,400	90,400	91,400	
		<i>New Assistant</i>	<i>1</i>	<i>88,400</i>	<i>88,400</i>	<i>88,400</i>	<i>88,400</i>	
Civil and Environmental Engrng 1590	14.0801	Professor	11	91,728	158,237	121,305	116,828	\$104,898
		Associate Prof	5	86,392	98,199	90,659	87,744	
		Assistant Prof	5	78,000	90,252	83,039	80,080	
		<i>New Assistant</i>	<i>1</i>	<i>80,080</i>	<i>80,080</i>	<i>80,080</i>	<i>80,080</i>	
School of Elect Eng & Comp Sci 1770	14.1001	Professor	14	81,733	262,277	144,585	138,498	\$121,623
		Associate Prof	11	89,801	110,939	101,198	101,035	
		Assistant Prof	4	90,191	103,999	97,428	97,761	

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
		<i>New Assistant</i>	<i>0</i>					



Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
School of Mech & Mats Eng 2540	14.1901	Professor	13	102,389	214,429	133,186	119,853	\$113,242
		Associate Prof	4	88,116	106,171	98,422	99,701	
		Assistant Prof	6	74,880	85,536	79,909	80,020	
			0	0	0	0	0	
		<i>New Assistant</i>	<i>1</i>	<i>79,040</i>	<i>79,040</i>	<i>79,040</i>	<i>79,040</i>	
Engineering & Technology Mgt 7980	15.1501	Professor	0					#DIV/0!
		Associate Prof	0					
		Assistant Prof	0					
			0					
		<i>New Assistant</i>	<i>0</i>					
WSU Vancouver School of ENCS 8603	14.1901	Professor	1	144,549	144,549	144,549	144,549	\$88,764
		Associate Prof	4	79,055	94,282	86,557	86,446	
		Assistant Prof	9	76,960	90,340	83,547	83,340	
			1	88,400	88,400	88,400	88,400	
		<i>New Assistant</i>	<i>1</i>	<i>88,400</i>	<i>88,400</i>	<i>88,400</i>	<i>88,400</i>	
College of Nursing 0006	51.3801	Professor	2	92,887	95,463	94,175	94,175	\$74,686
		Associate Prof	10	74,391	107,215	82,351	78,117	
		Assistant Prof	19	65,520	75,639	68,600	67,600	
			2	72,072	75,639	73,855	73,855	
		<i>New Assistant</i>	<i>2</i>	<i>72,072</i>	<i>75,639</i>	<i>73,855</i>	<i>73,855</i>	
College of Medical Sciences		Professor	4	80,257	126,004	109,408	115,686	\$91,912
		Associate Prof	7	69,686	119,683	87,317	88,400	
		Assistant Prof	4	76,960	88,400	82,457	82,234	
			0					
		<i>New Assistant</i>	<i>0</i>					
Medical Sciences 1360, 8632		Professor	1	80,257	80,257	80,257	80,257	\$88,111
		Associate Prof	5	69,686	119,683	92,033	88,795	
		Assistant Prof	2	77,421	87,048	82,234	82,234	
			0	0	0	0	0	
		<i>New Assistant</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>		
Speech and Hearing Sciences 3150	51.0204	Professor	1	117,858	117,858	117,858	117,858	\$86,468
		Associate Prof	2	74,919	76,136	75,527	75,527	
		Assistant Prof	1	76,960	76,960	76,960	76,960	
			0					
		<i>New Assistant</i>	<i>0</i>					
Health Policy & Administration 8543	51.0701	Professor	2	113,514	126,004	119,759	119,759	\$109,306
		Associate Prof	0					
		Assistant Prof	1	88,400	88,400	88,400	88,400	
			0					
		<i>New Assistant</i>	<i>0</i>					
College of Arts and Sciences		Professor	118	64,709	255,273	98,729	88,323	\$79,273
		Associate Prof	121	52,000	93,600	69,968	68,863	
		Assistant Prof	70	46,800	78,000	62,560	62,400	
			18	58,240	78,000	68,003	67,600	
		<i>New Assistant</i>	<i>18</i>	<i>58,240</i>	<i>78,000</i>	<i>68,003</i>	<i>67,600</i>	
School of Biological Sciences 8434	26.0101	Professor	10	72,860	155,564	98,168	92,809	\$82,370
		Associate Prof	14	65,616	87,786	77,351	80,244	
		Assistant Prof	7	61,894	78,000	69,840	69,680	
			0					

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
		<i>New Assistant</i>	<i>2</i>	<i>78,000</i>	<i>78,000</i>	<i>78,000</i>	<i>78,000</i>	

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
Chemistry 1540	40.0501	Professor	14	88,236	159,551	124,814	124,452	\$107,225
		Associate Prof	5	71,262	93,600	83,853	83,000	
		Assistant Prof	4	70,720	78,000	74,879	75,398	
		<i>New Assistant</i>	<i>2</i>	<i>72,800</i>	<i>77,997</i>	<i>75,398</i>	<i>75,398</i>	
School of the Environment-CAS 8626	3.0104	Professor	7	80,605	125,366	97,412	96,016	\$84,656
		Associate Prof	3	69,095	85,728	76,107	73,500	
		Assistant Prof	3	60,320	67,600	63,440	62,400	
		<i>New Assistant</i>	<i>1</i>	<i>67,600</i>	<i>67,600</i>	<i>67,600</i>	<i>67,600</i>	
Physics and Astronomy 2790	40.0801	Professor	9	82,571	190,000	116,020	116,086	\$100,926
		Associate Prof	4	76,080	85,395	80,878	81,019	
		Assistant Prof	2	70,202	76,000	73,101	73,101	
		<i>New Assistant</i>	<i>0</i>					
Mathematics 2530	27.0101	Professor	17	73,301	156,000	86,686	84,107	\$78,427
		Associate Prof	8	62,786	88,400	73,832	71,053	
		Assistant Prof	8	62,192	67,600	65,471	66,560	
		<i>New Assistant</i>	<i>3</i>	<i>67,600</i>	<i>67,600</i>	<i>67,600</i>	<i>67,600</i>	
Anthropology 1250	45.0201	Professor	3	81,590	120,590	97,280	89,660	\$72,425
		Associate Prof	9	66,560	80,176	71,391	69,006	
		Assistant Prof	6	55,109	67,503	61,549	61,360	
		<i>New Assistant</i>	<i>1</i>	<i>63,960</i>	<i>63,960</i>	<i>63,960</i>	<i>63,960</i>	
Crit Culture/Gndr/Race Studies 8683	5.0200	Professor	2	83,613	85,232	84,423	84,423	\$69,375
		Associate Prof	9	60,816	74,796	66,031	65,688	
		Assistant Prof	0					
		<i>New Assistant</i>	<i>0</i>					
English 1830	23.0101	Professor	10	72,800	157,701	89,662	81,245	\$72,287
		Associate Prof	17	60,478	77,310	68,467	68,567	
		Assistant Prof	8	55,120	62,817	58,687	58,521	
		<i>New Assistant</i>	<i>1</i>	<i>60,840</i>	<i>60,840</i>	<i>60,840</i>	<i>60,840</i>	
Fine Arts 1940	50.0702	Professor	3	65,813	89,460	81,140	88,146	\$63,417
		Associate Prof	7	56,215	66,560	60,886	60,748	
		Assistant Prof	5	54,000	60,320	56,328	56,160	
		<i>New Assistant</i>	<i>1</i>	<i>60,320</i>	<i>60,320</i>	<i>60,320</i>	<i>60,320</i>	
Foreign Languages & Cultures 1980	16.0101	Professor	3	70,898	82,949	75,040	71,272	\$65,122
		Associate Prof	3	58,544	71,870	65,893	67,265	
		Assistant Prof	4	54,080	61,500	57,106	56,423	
		<i>New Assistant</i>	<i>0</i>					
History 2160	54.0101	Professor	8	70,260	255,273	112,264	82,967	\$79,589
		Associate Prof	10	54,213	76,234	63,445	62,158	
		Assistant Prof	4	52,000	58,240	54,600	54,080	

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
		<i>New Assistant</i>	<i>1</i>	<i>58,240</i>	<i>58,240</i>	<i>58,240</i>	<i>58,240</i>	

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
School of Music 2590	50.0901	Professor	4	69,162	103,973	84,282	81,996	\$61,203
		Associate Prof	6	52,000	59,706	55,638	55,351	
		Assistant Prof	6	46,800	55,348	51,383	50,960	
		<i>New Assistant</i>	<i>0</i>					
Criminal Justice & Criminology 1710	43.0107	Professor	4	77,373	111,328	91,375	88,400	\$74,076
		Associate Prof	4	57,880	72,800	66,334	67,329	
		Assistant Prof	4	62,400	67,392	64,520	64,144	
		<i>New Assistant</i>	<i>1</i>	<i>67,392</i>	<i>67,392</i>	<i>67,392</i>	<i>67,392</i>	
Politics Phlsphy & Pub Affrs 8697	45.1001	Professor	7	71,269	94,185	80,167	79,088	\$72,326
		Associate Prof	8	57,108	91,418	70,012	69,883	
		Assistant Prof	4	57,200	70,928	63,232	62,400	
		<i>New Assistant</i>	<i>1</i>	<i>62,400</i>	<i>62,400</i>	<i>62,400</i>	<i>62,400</i>	
Psychology 2900	42.0101	Professor	10	81,000	177,382	103,939	95,001	\$84,872
		Associate Prof	9	60,976	75,040	68,846	69,708	
		Assistant Prof	3	66,560	74,029	69,396	67,600	
		<i>New Assistant</i>	<i>2</i>	<i>67,600</i>	<i>74,029</i>	<i>70,815</i>	<i>70,815</i>	
Sociology 3120	45.1101	Professor	6	84,656	101,274	90,981	90,160	\$80,490
		Associate Prof	6	73,978	87,175	77,280	74,946	
		Assistant Prof	3	59,280	72,800	65,926	65,699	
		<i>New Assistant</i>	<i>2</i>	<i>59,280</i>	<i>72,800</i>	<i>66,040</i>	<i>66,040</i>	
College of Veterinary Medicine		<b>Professor</b>	<b>45</b>	<b>81,937</b>	<b>333,452</b>	<b>141,090</b>	<b>134,444</b>	\$111,223
		<b>Associate Prof</b>	<b>34</b>	<b>66,607</b>	<b>121,680</b>	<b>90,830</b>	<b>88,350</b>	
		<b>Assistant Prof</b>	<b>22</b>	<b>66,600</b>	<b>97,854</b>	<b>81,650</b>	<b>81,923</b>	
		<i>New Assistant</i>	<i>0</i>					
Sch of Molecular Biosciences 8433	26.021	Professor	14	81,937	208,915	145,799	148,855	\$111,253
		Associate Prof	8	66,607	90,020	80,283	79,396	
		Assistant Prof	6	66,600	86,320	71,939	69,680	
		<i>New Assistant</i>	<i>0</i>					
Integrative Physiology & Neuro 3420	51.2401	Professor	5	93,856	229,165	139,474	127,975	\$99,224
		Associate Prof	10	79,647	113,454	88,536	82,958	
		Assistant Prof	5	71,136	88,797	80,352	84,279	
		<i>New Assistant</i>	<i>0</i>					
Vet Clin Sci 3460	51.2401	Professor	13	87,664	278,479	124,601	105,766	\$106,905
		Associate Prof	14	85,156	121,680	96,235	93,875	
		Assistant Prof	5	79,568	97,854	90,768	93,600	
		<i>New Assistant</i>	<i>0</i>					
Veterinary Microbiology & Path 3490	51.2401	Professor	9	91,185	154,072	120,742	118,778	\$107,348
		Associate Prof	2	105,850	107,436	106,643	106,643	
		Assistant Prof	5	76,582	93,232	83,519	79,557	

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
		<i>New Assistant</i>	<i>0</i>					

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
Global Animal Health, Paul G. Allen 8670	51.2401	Professor	3	142,250	333,452	252,167	280,800	\$211,994
		Associate Prof	0					
		Assistant Prof	1	91,473	91,473	91,473	91,473	
		<i>New Assistant</i>	<i>0</i>					
<b>Carson College of Business</b>		<b>Professor</b>	<b>21</b>	<b>103,565</b>	<b>164,713</b>	<b>132,458</b>	<b>128,123</b>	\$130,543
		<b>Associate Prof</b>	<b>16</b>	<b>91,404</b>	<b>224,776</b>	<b>127,934</b>	<b>122,352</b>	
		<b>Assistant Prof</b>	<b>13</b>	<b>112,900</b>	<b>153,700</b>	<b>130,658</b>	<b>126,880</b>	
		<i>New Assistant</i>	<i>2</i>	<i>125,300</i>	<i>125,300</i>	<i>125,300</i>	<i>125,300</i>	
Accounting 1060	52.0301	Professor	4	120,106	135,227	126,551	125,435	\$133,412
		Associate Prof	3	119,218	124,583	121,049	119,346	
		Assistant Prof	4	147,680	153,700	149,545	148,400	
		<i>New Assistant</i>	<i>0</i>					
Dept of Finance & Mgmt Science 1460	52.0801	Professor	5	122,407	163,885	140,506	142,811	\$146,827
		Associate Prof	3	138,817	224,776	169,682	145,452	
		Assistant Prof	2	126,880	129,811	128,345	128,345	
		<i>New Assistant</i>	<i>0</i>					
School of Hospitality Bus Mgt 2220	52.0901	Professor	2	120,736	164,713	142,724	142,724	\$119,335
		Associate Prof	3	91,404	124,355	103,742	95,467	
		Assistant Prof	0					
		<i>New Assistant</i>	<i>0</i>					
Department of Management 2500	52.0201	Professor	4	121,639	138,797	128,596	126,975	\$123,467
		Associate Prof	4	104,719	135,366	123,247	126,451	
		Assistant Prof	2	112,900	114,400	113,650	113,650	
		<i>New Assistant</i>	<i>0</i>					
Dept Mgmt Info Sys & Entrep 8595	52.1201	Professor	1	140,106	140,106	140,106	140,106	\$127,680
		Associate Prof	1	120,013	120,013	120,013	120,013	
		Assistant Prof	2	125,300	125,300	125,300	125,300	
		<i>New Assistant</i>	<i>2</i>	<i>125,300</i>	<i>125,300</i>	<i>125,300</i>	<i>125,300</i>	
Dept of Marketing & Intl Bus 7190	52.1401	Professor	5	103,565	143,750	126,589	128,123	\$124,926
		Associate Prof	2	120,350	130,180	125,265	125,265	
		Assistant Prof	3	114,400	127,897	121,929	123,490	
		<i>New Assistant</i>	<i>0</i>					
<b>College of Education</b>		<b>Professor</b>	<b>18</b>	<b>82,086</b>	<b>126,615</b>	<b>93,273</b>	<b>87,415</b>	\$75,709
		<b>Associate Prof</b>	<b>19</b>	<b>61,658</b>	<b>81,920</b>	<b>70,759</b>	<b>70,116</b>	
		<b>Assistant Prof</b>	<b>15</b>	<b>57,200</b>	<b>65,536</b>	<b>60,903</b>	<b>60,320</b>	
		<i>New Assistant</i>	<i>7</i>	<i>57,200</i>	<i>62,400</i>	<i>60,246</i>	<i>59,280</i>	
Educ Ldshp Sport Stu Ed/Co-Psy 3520	13.0401	Professor	9	82,295	115,601	92,757	85,298	\$78,596
		Associate Prof	6	62,815	78,184	71,558	73,127	
		Assistant Prof	5	59,280	65,536	61,553	60,320	

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
		<i>New Assistant</i>	<i>1</i>	<i>59,280</i>	<i>59,280</i>	<i>59,280</i>	<i>59,280</i>	



Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
Teaching and Learning 1750	13.1206	Professor	9	82,086	126,615	93,789	88,649	\$73,905
		Associate Prof	13	61,658	81,920	70,390	70,116	
		Assistant Prof	10	57,200	62,902	60,578	60,580	
		<i>New Assistant</i>	<i>6</i>	<i>57,200</i>	<i>62,400</i>	<i>60,407</i>	<i>60,840</i>	
Murrow College of Comm 1610	9.0102	Professor	3	98,101	129,986	112,662	109,898	\$80,806
		Associate Prof	6	59,445	82,592	75,632	77,956	
		Assistant Prof	6	67,500	78,000	70,053	68,250	
		<i>New Assistant</i>	<i>1</i>	<i>67,598</i>	<i>67,598</i>	<i>67,598</i>	<i>67,598</i>	
College of Pharmacy		Professor	7	108,761	212,727	145,552	147,523	\$110,407
		Associate Prof	5	68,934	112,320	89,299	91,283	
		Assistant Prof	5	69,774	91,636	82,312	84,011	
		<i>New Assistant</i>	<i>0</i>					
Pharmaceutical Sciences 8314	51.2003	Professor	2	147,523	212,727	180,125	180,125	\$117,944
		Associate Prof	2	80,357	93,600	86,979	86,979	
		Assistant Prof	2	81,818	91,636	86,727	86,727	
		<i>New Assistant</i>	<i>0</i>					
Pharmacotherapy, 8315	51.2001	Professor	4	108,761	164,115	126,362	116,286	\$113,457
		Associate Prof	1	91,283	91,283	91,283	91,283	
		Assistant Prof	1	84,011	84,011	84,011	84,011	
		<i>New Assistant</i>	<i>0</i>					
Experimental & Sys Pharmacology 6560		Professor	1	153,164	153,164	153,164	153,164	\$116,602
		Associate Prof	1	112,320	112,320	112,320	112,320	
		Assistant Prof	1	84,322	84,322	84,322	84,322	
		<i>New Assistant</i>	<i>0</i>					
<b>University Totals</b>		Professor	<b>345</b>	<b>64,709</b>	<b>333,452</b>	<b>116,438</b>	<b>107,177</b>	\$93,910
		Associate Prof	<b>312</b>	<b>52,000</b>	<b>224,776</b>	<b>81,400</b>	<b>76,185</b>	
		Assistant Prof	<b>214</b>	<b>46,800</b>	<b>153,700</b>	<b>75,831</b>	<b>69,680</b>	
		<i>New Assistant</i>	<i>36</i>	<i>57,200</i>	<i>125,300</i>	<i>72,389</i>	<i>67,600</i>	
(includes full-time instructional faculty regardless of whether included in area or dept detail)								
Top 3 ranks combined			871	\$93,910				

## NOTES:

These data are for internal use and include faculty raises implemented on 01/01/2014. However, the data submitted to the OSU Salary Survey were from the September 30, 2013 RG2 Employee Appointment Download from HEPPS.

Data used for this analysis were obtained from the January 31, 2014 RG2 Employee Appointment Download from HEPPS.

Salaries for faculty with 10 month appointments are converted to a 9 month equivalent by: salary\*9.

Salaries for faculty with 11/12 month appointment terms are converted to a 9 month equivalent by: salary\*term\*.818181818.

All salaries are full-time salaries.

2010 CIP Codes are used.

## CRITERIA:

Active Instructional Faculty appointments as of 01/31/2014 with a pay rate code of Monthly are included.

Full-time faculty are included if their combined instructional and research FTE is .50 or more. Directors/chairs in academic units are included as instructional. Only Faculty with a tenure status code of T or P are included. Full-time is based on the full\_part='F', and only includes faculty with 1.0 FTE from all appointments and those on professional leave with less than 1.0 FTE. Regents' Professors are reported in the Professor rank.

Most departments are detailed by academic college. No rank level detail is included for non-academic areas.

College and university level details include instructional faculty fitting survey criteria even if departmental information was not submitted to the OSU Salary Survey.

Dept. No.	Reported CIP Code	Rank	Hdct.	Lowest Salary	Highest Salary	Average Salary	Median Salary	Wtd Avg Prof Ranks
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Split appointments are counted in all of the departments and areas for which they pertain.

Duplicate appointments within a department are deleted from department totals.

Duplicate appointments within an area are deleted from area totals.

Duplicate appointments within the university are deleted from university totals.

## Full-time Instructional Faculty Salaries WSU Spring 2014 and Legislative Peers AY14

Percentage Difference by Area & Department, Top 3 Ranks Only

(All salaries are reported on a 9-month basis)

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			% in		Avg Salary	Min. No. of Peer Inst*	% in			Avg Salary
			Hdct.	Rank			Hdct.	Rank		
College of Agricultural Human & Natural Res Sci		Professor	76	45%	115,858		1,911	53%	119,375	-3.0%
		Assoc Prof	61	36%	81,554		998	27%	87,191	-6.9%
		Asst Prof	31	18%	81,462		724	20%	77,979	4.3%
		<b>Weighted Avg</b>	<b>168</b>		<b>97,056</b>		<b>3,633</b>		<b>102,284</b>	<b>-5.4%</b>
School of Economic Sciences 1150	1.0103 45.0601	Professor	11	52%	132,323	19	400	56%	151,768	-14.7%
		Assoc Prof	4	19%	101,220	18	171	24%	110,966	-9.6%
		Asst Prof	6	29%	100,471	18	146	20%	100,484	-0.0%
		<b>Weighted Avg</b>	<b>21</b>		<b>117,298</b>		<b>717</b>		<b>131,594</b>	<b>-12.2%</b>
Biological Systems Engineering 1170	14.0301	Professor	5	38%	168,259	17	118	46%	123,719	26.5%
		Assoc Prof	4	31%	100,745	17	92	36%	90,955	9.7%
		Asst Prof	4	31%	89,618	15	46	18%	80,382	10.3%
		<b>Weighted Avg</b>	<b>13</b>		<b>123,288</b>		<b>256</b>		<b>104,157</b>	<b>15.5%</b>
Crop and Soil Sciences 1200	1.1102 1.1201	Professor	12	50%	111,776	16	288	61%	109,292	2.2%
		Assoc Prof	7	29%	83,144	15	115	24%	83,607	-0.6%
		Asst Prof	5	21%	89,122	14	72	15%	73,663	17.3%
		<b>Weighted Avg</b>	<b>24</b>		<b>98,705</b>		<b>475</b>		<b>97,673</b>	<b>1.0%</b>
Animal Sciences 1240	1.0901	Professor	8	62%	106,612	21	282	55%	111,070	-4.2%
		Assoc Prof	5	38%	87,110	20	132	26%	79,616	8.6%
		Asst Prof	0	0%		20	103	20%	71,379	
		<b>Weighted Avg</b>	<b>13</b>		<b>99,111</b>		<b>517</b>		<b>95,132</b>	<b>4.0%</b>
Entomology 1840	26.0702 1.1105	Professor	9	64%	91,483	20	191	62%	101,517	-11.0%
		Assoc Prof	4	29%	71,394	19	71	23%	79,188	-10.9%
		Asst Prof	1	7%	79,000	19	47	15%	71,863	9.0%
		<b>Weighted Avg</b>	<b>14</b>		<b>84,852</b>		<b>309</b>		<b>91,876</b>	<b>-8.3%</b>
School of Food Science 1960	1.1001	Professor	4	50%	106,717	14	99	52%	115,827	-8.5%
		Assoc Prof	2	25%	77,252	13	57	30%	84,299	-9.1%
		Asst Prof	2	25%	70,849	12	36	19%	74,282	-4.8%
		<b>Weighted Avg</b>	<b>8</b>		<b>90,384</b>		<b>192</b>		<b>98,677</b>	<b>-9.2%</b>
Human Development 8345	19.0101 19.0701	Professor	0	0%		12	116	38%	123,947	
		Assoc Prof	9	75%	67,221	12	100	33%	84,377	-25.5%
		Asst Prof	3	25%	65,047	13	86	28%	74,783	-15.0%
		<b>Weighted Avg</b>	<b>12</b>		<b>66,678</b>		<b>302</b>		<b>96,844</b>	<b>-45.2%</b>
Horticulture 2210	1.1103	Professor	6	38%	105,726	14	179	58%	105,528	0.2%
		Assoc Prof	9	56%	88,986	14	89	29%	79,889	10.2%
		Asst Prof	1	6%	70,527	10	43	14%	68,936	2.3%
		<b>Weighted Avg</b>	<b>16</b>		<b>94,110</b>		<b>311</b>		<b>93,131</b>	<b>1.0%</b>
Apparel Merch Design & Text 1600	19.0901	Professor	2	40%	87,824	7	26	31%	118,995	-35.5%
		Assoc Prof	2	40%	75,457	7	29	34%	77,355	-2.5%
		Asst Prof	1	20%	67,600	7	30	35%	66,447	1.7%
		<b>Weighted Avg</b>	<b>5</b>		<b>78,832</b>		<b>85</b>		<b>86,242</b>	<b>-9.4%</b>
Sch of Design & Const-CAHNRS 8708	19.0601 50.0408 4.0601	Professor	0	0%		8	41	28%	104,541	
		Assoc Prof	3	60%	69,854	12	61	41%	78,569	-12.5%
		Asst Prof	2	40%	61,483	11	47	32%	66,918	-8.8%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			Hdct.	Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	Rank		Avg Salary
		Weighted Avg	5		66,506		149		82,040	-23.4%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			% in		Avg Salary	Min. No. of Peer Inst*	% in			Avg Salary
			Hdct.	Rank			Hdct.	Rank		
Sch of the Environment-CAHNRS 1990	3.0101 3.0506	Professor	4	33%	96,870	6	55	44%	110,644	-14.2%
		Assoc Prof	7	58%	67,248	6	38	30%	86,887	-29.2%
		Asst Prof	1	8%	64,500	5	33	26%	69,762	-8.2%
		Weighted Avg	12		76,893		126		92,772	-20.7%
Plant Pathology 2810	26.0305	Professor	10	71%	96,975	15	116	60%	107,171	-10.5%
		Assoc Prof	2	14%	65,113	12	43	22%	75,263	-15.6%
		Asst Prof	2	14%	54,920	11	35	18%	72,703	-32.4%
		Weighted Avg	14		86,415		194		93,880	-8.6%
Institute of Biological Chem 1140	26.0307 26.0308	Professor	3	38%	199,595	No Peers Reporting				
		Assoc Prof	3	38%	113,990					
		Asst Prof	2	25%	88,917					
		Weighted Avg	8		139,824					
Voiland College of Engineering and Architecture		Professor	50	43%	134,104		2,681	50%	144,013	-7.4%
		Assoc Prof	38	32%	93,269		1,686	31%	101,369	-8.7%
		Asst Prof	29	25%	84,477		986	18%	88,346	-4.6%
		Weighted Avg	117		108,541		5,353		120,328	-10.9%
School of Design & Const, CEA 1260	4.0201 15.1001	Professor	4	33%	92,736	14	114	34%	110,442	-19.1%
		Assoc Prof	7	58%	75,025	14	138	41%	82,133	-9.5%
		Asst Prof	1	8%	53,966	14	81	24%	67,505	-25.1%
		Weighted Avg	12		79,174		333		88,266	-11.5%
Chemical Engr & Bioenrg 1520	14.0701 14.0501	Professor	6	38%	152,075	19	254	47%	148,266	2.5%
		Assoc Prof	7	44%	101,808	19	159	29%	101,199	0.6%
		Asst Prof	3	19%	90,400	17	130	24%	89,145	1.4%
		Weighted Avg	16		118,519		543		120,330	-1.5%
Civil and Environmental Engrng 1590	14.0801 14.1401	Professor	11	52%	121,305	17	248	52%	135,178	-11.4%
		Assoc Prof	5	24%	90,659	17	139	29%	99,081	-9.3%
		Asst Prof	5	24%	83,039	16	93	19%	86,295	-3.9%
		Weighted Avg	21		104,897		480		115,254	-9.9%
School of Elect Eng & Comp Sci 1770	14.1001 11.0101 11.0701	Professor	14	48%	144,585	20	726	51%	148,320	-2.6%
		Assoc Prof	11	38%	101,198	20	486	34%	105,212	-4.0%
		Asst Prof	4	14%	97,428	20	212	15%	92,918	4.6%
		Weighted Avg	29		121,623		1,424		125,360	-3.1%
School of Mech & Matls Eng 2540	14.1801 14.1901	Professor	13	57%	133,186	19	439	52%	145,346	-9.1%
		Assoc Prof	4	17%	98,422	19	228	27%	101,521	-3.1%
		Asst Prof	6	26%	79,909	19	174	21%	89,024	-11.4%
		Weighted Avg	23		113,242		841		121,812	-7.6%
Engineering & Computer Science, WSU Vancouver (ENCS) 8603	11.0701, 14.1001, 14.1901	Professor	1	7%	144,549	20	900	52%	145,375	-0.6%
		Assoc Prof	4	29%	86,557	20	536	31%	103,417	-19.5%
		Asst Prof	9	64%	83,547	20	296	17%	90,671	-8.5%
		Weighted Avg	14		88,764		1,732		123,041	-38.6%
College of Nursing 0006	51.3801	Professor	2	6%	94,175	8	48	24%	119,658	-27.1%
		Assoc Prof	10	32%	82,351	9	86	42%	94,025	-14.2%
		Asst Prof	19	61%	68,600	9	69	34%	77,705	-13.3%
		Weighted Avg	31		74,686		203		94,539	-26.6%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead		
			% in		Avg Salary	Min. No. of Peer Inst*	% in			Avg Salary	
			Hdct.	Rank			Hdct.	Rank			
College of Medical Sciences		Professor	4	27%	109,408		35	35%	119,548	-9.3%	
			Assoc Prof	7	47%	87,317		35	35%	81,132	7.1%
			Asst Prof	4	27%	82,457		31	31%	67,347	18.3%
			<b>Weighted Avg</b>	<b>15</b>		<b>91,912</b>		<b>101</b>		<b>90,213</b>	<b>1.8%</b>
Medical Sciences 1360, 8632		Professor	1	13%	80,257						
			Assoc Prof	5	63%	92,033					
			Asst Prof	2	25%	82,234					
			<b>Weighted Avg</b>	<b>8</b>		<b>88,111</b>					
Speech and Hearing Sciences 3150	51.0201, 51.0202 51.0203, 51.0204	Professor	1	25%	117,858	7	33	35%	118,071	-0.2%	
			Assoc Prof	2	50%	75,527	9	32	34%	80,131	-6.1%
			Asst Prof	1	25%	76,960	9	29	31%	66,370	13.8%
			<b>Weighted Avg</b>	<b>4</b>		<b>86,468</b>		<b>94</b>		<b>89,205</b>	<b>-3.2%</b>
Health Policy & Administration 8543, 8343	51.0701	Professor	2	67%	119,759	2	2	29%	143,924	-20.2%	
			Assoc Prof	0	0%		2	3	43%	91,809	
			Asst Prof	1	33%	88,400	2	2	29%	81,510	7.8%
			<b>Weighted Avg</b>	<b>3</b>		<b>109,306</b>		<b>7</b>		<b>103,756</b>	<b>5.1%</b>
College of Arts and Sciences		Professor	118	38%	98,729		4,474	49%	120,475	-22.0%	
			Assoc Prof	121	39%	69,968		2,867	31%	80,094	-14.5%
			Asst Prof	70	23%	62,560		1,848	20%	69,380	-10.9%
			<b>Weighted Avg</b>	<b>309</b>		<b>79,273</b>		<b>9,189</b>		<b>97,600</b>	<b>-23.1%</b>
School of Biological Sciences 8434, 1440, 3610, 1400	26.0101, 26.0301, 26.0701 26.0804, 51.1102	Professor	10	32%	98,168	12	400	52%	127,355	-29.7%	
			Assoc Prof	14	45%	77,351	11	215	28%	81,707	-5.6%
			Asst Prof	7	23%	69,840	12	148	19%	72,692	-4.1%
			<b>Weighted Avg</b>	<b>31</b>		<b>82,370</b>		<b>763</b>		<b>103,889</b>	<b>-26.1%</b>
Chemistry 1540	40.0501	Professor	14	61%	124,814	19	357	59%	137,909	-10.5%	
			Assoc Prof	5	22%	83,853	19	127	21%	85,006	-1.4%
			Asst Prof	4	17%	74,879	19	119	20%	75,004	-0.2%
			<b>Weighted Avg</b>	<b>23</b>		<b>107,225</b>		<b>603</b>		<b>114,353</b>	<b>-6.6%</b>
School of the Environment-CAS 8626	4.0301, 40.0601 3.0104	Professor	7	54%	97,412	19	200	55%	115,479	-18.5%	
			Assoc Prof	3	23%	76,107	18	85	24%	82,727	-8.7%
			Asst Prof	3	23%	63,440	17	76	21%	69,552	-9.6%
			<b>Weighted Avg</b>	<b>13</b>		<b>84,656</b>		<b>361</b>		<b>98,098</b>	<b>-15.9%</b>
Physics and Astronomy 2790	40.0801 40.0201	Professor	9	60%	116,020	21	555	66%	126,401	-8.9%	
			Assoc Prof	4	27%	80,878	21	181	21%	88,427	-9.3%
			Asst Prof	2	13%	73,101	21	111	13%	76,579	-4.8%
			<b>Weighted Avg</b>	<b>15</b>		<b>100,926</b>		<b>847</b>		<b>111,757</b>	<b>-10.7%</b>
Mathematics 2530	27.0101 27.0301 27.0501	Professor	17	52%	86,686	22	778	58%	122,361	-41.2%	
			Assoc Prof	8	24%	73,832	22	330	24%	86,827	-17.6%
			Asst Prof	8	24%	65,471	21	243	18%	76,533	-16.9%
			<b>Weighted Avg</b>	<b>33</b>		<b>78,427</b>		<b>1,351</b>		<b>105,438</b>	<b>-34.4%</b>
Anthropology 1250	45.0201 45.0301	Professor	3	17%	97,280	17	95	37%	109,434	-12.5%	
			Assoc Prof	9	50%	71,391	17	90	35%	79,014	-10.7%
			Asst Prof	6	33%	61,549	17	69	27%	65,129	-5.8%
			<b>Weighted Avg</b>	<b>18</b>		<b>72,425</b>		<b>254</b>		<b>86,620</b>	<b>-19.6%</b>
Crit Culture/Gndr/Race Studies 8683	5.0200	Professor	2	18%	84,423	10	42	31%	124,020	-46.9%	
		Assoc Prof	9	82%	66,031	8	53	39%	89,897	-36.1%	
		Asst Prof	0	0%		7	41	30%	67,860		

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead
			Hdct.	Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	Rank	
		Weighted Avg	11		69,375		136	93,791	-35.2%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			% in		Avg Salary	Min. No. of Peer Inst*	% in			Avg Salary
			Hdct.	Rank			Hdct.	Rank		
English 1830	10.0105, 16.0104, 23.0101, 23.0401 23.1302, 23.1303, 24.0103	Professor	10	29%	89,662	22	435	44%	108,406	-20.9%
		Assoc Prof	17	49%	68,467	22	371	38%	73,963	-8.0%
		Asst Prof	8	23%	58,687	21	173	18%	62,168	-5.9%
		Weighted Avg	35		72,287		979		87,183	-20.6%
Fine Arts 1940	50.0702 50.0703	Professor	3	20%	81,140	6	54	34%	93,239	-14.9%
		Assoc Prof	7	47%	60,886	6	66	42%	76,356	-25.4%
		Asst Prof	5	33%	56,328	5	39	25%	60,046	-6.6%
		Weighted Avg	15		63,417		159		78,089	-23.1%
Foreign Languages & Cultures 1980	16.0101, 16.0301, 16.0501 16.0901, 16.0905	Professor	3	30%	75,040	14	177	32%	100,260	-33.6%
		Assoc Prof	3	30%	65,893	13	245	44%	71,378	-8.3%
		Asst Prof	4	40%	57,106	14	130	24%	60,102	-5.2%
		Weighted Avg	10		65,122		552		77,984	-19.7%
History 2160	54.0101, 54.0102, 54.0103 54.0105, 54.0106, 5.0103	Professor	8	36%	112,264	21	265	41%	111,018	1.1%
		Assoc Prof	10	45%	63,445	21	258	40%	76,437	-20.5%
		Asst Prof	4	18%	54,600	19	120	19%	63,232	-15.8%
		Weighted Avg	22		79,589		643		88,224	-10.8%
School of Music 2590	50.0901, 50.0903, 50.0904 13.1312	Professor	4	25%	84,282	15	247	42%	92,769	-10.1%
		Assoc Prof	6	38%	55,638	15	211	36%	70,050	-25.9%
		Asst Prof	6	38%	51,383	15	125	21%	59,407	-15.6%
		Weighted Avg	16		61,203		583		77,393	-26.5%
Criminal Justice & Criminology 1710	43.0103, 43.0104, 43.0107	Professor	4	33%	91,375	1	11	44%	142,886	-56.4%
		Assoc Prof	4	33%	66,334	1	10	40%	87,655	-32.1%
		Asst Prof	4	33%	64,520	2	4	16%	76,645	-18.8%
		Weighted Avg	12		74,076		25		110,195	-48.8%
Politics Phlsphy & Pub Affrs 8697	45.1001 38.0101, 38.0103, 44.0501	Professor	7	37%	80,167	21	330	41%	124,809	-55.7%
		Assoc Prof	8	42%	70,012	21	280	35%	82,512	-17.9%
		Asst Prof	4	21%	63,232	21	201	25%	68,881	-8.9%
		Weighted Avg	19		72,326		811		96,344	-33.2%
Psychology 2900	42.0101 42.2801	Professor	10	45%	103,939	21	348	49%	132,624	-27.6%
		Assoc Prof	9	41%	68,846	21	204	29%	83,379	-21.1%
		Asst Prof	3	14%	69,396	21	157	22%	73,894	-6.5%
		Weighted Avg	22		84,872		709		105,450	-24.2%
Sociology 3120	45.1101	Professor	6	40%	90,981	20	180	44%	124,270	-36.6%
		Assoc Prof	6	40%	77,280	19	141	34%	81,837	-5.9%
		Asst Prof	3	20%	65,926	20	92	22%	69,647	-5.6%
		Weighted Avg	15		80,490		413		97,615	-21.3%
College of Veterinary Medicine		Professor	45	45%	141,090		2,203	47%	122,996	12.8%
		Assoc Prof	34	34%	90,830		1,427	30%	95,367	-5.0%
		Asst Prof	22	22%	81,650		1,057	23%	86,233	-5.6%
		Weighted Avg	101		111,223		4,687		106,293	4.4%
Sch of Molecular Biosciences 8433	26.0202, 26.0203, 26.0406 26.0502, 26.0804, 26.0805 26.1201, 26.0210	Professor	14	50%	145,799	13	280	53%	132,171	9.3%
		Assoc Prof	8	29%	80,283	12	135	26%	82,639	-2.9%
		Asst Prof	6	21%	71,939	13	111	21%	73,519	-2.2%
		Weighted Avg	28		111,253		526		107,081	3.7%
Integrative Physiology & Neuro 3420	51.2401, 51.2502 51.2503, 51.2506	Professor	5	25%	139,474	13	408	46%	121,245	13.1%
		Assoc Prof	10	50%	88,536	12	284	32%	95,269	-7.6%
		Asst Prof	5	25%	80,352	12	189	21%	86,893	-8.1%



Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			Hdct.	Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	Rank		Avg Salary
		Weighted Avg	20		99,225		881		105,502	-6.3%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			% in		Avg Salary	Min. No. of Peer Inst*	% in			Avg Salary
			Hdct.	Rank			Hdct.	Rank		
Vet Clin Sci 3460	51.2401, 51.2501 51.2507, 51.2508	Professor	13	41%	124,601	13	573	46%	122,164	2.0%
		Assoc Prof	14	44%	96,235	12	382	31%	97,609	-1.4%
		Asst Prof	5	16%	90,768	12	292	23%	88,383	2.6%
		Weighted Avg	32		106,904		1,247		106,732	0.2%
Veterinary Microbiology & Path 3490	51.2401, 51.2504 51.2505, 51.2511	Professor	9	56%	120,742	13	421	47%	121,113	-0.3%
		Assoc Prof	2	13%	106,643	12	279	31%	95,759	10.2%
		Asst Prof	5	31%	83,519	12	197	22%	86,903	-4.1%
		Weighted Avg	16		107,347		897		105,714	1.5%
Global Animal Health, Paul G. Allen 8670	51.2401, 51.2501 51.2504, 51.2511	Professor	3	75%	252,167	13	521	46%	121,874	51.7%
		Assoc Prof	0	0%	0	12	347	31%	97,614	
		Asst Prof	1	25%	91,473	12	268	24%	88,198	3.6%
		Weighted Avg	4		211,994		1,136		106,519	49.8%
Carson College of Business		Professor	21	42%	132,458		715	39%	200,254	-51.2%
		Assoc Prof	16	32%	127,934		545	30%	152,418	-19.1%
		Asst Prof	13	26%	130,658		582	32%	149,000	-14.0%
		Weighted Avg	50		130,542		1,842		169,907	-30.2%
Accounting 1060	52.0301 52.0201	Professor	4	36%	126,551	19	254	36%	204,484	-61.6%
		Assoc Prof	3	27%	121,049	19	217	31%	153,854	-27.1%
		Asst Prof	4	36%	149,545	19	240	34%	154,122	-3.1%
		Weighted Avg	11		133,412		711		172,032	-28.9%
Dept of Finance & Mgmt Science 1460	52.0801 52.1501 52.1701	Professor	5	50%	140,506	16	104	45%	209,728	-49.3%
		Assoc Prof	3	30%	169,682	15	54	23%	175,473	-3.4%
		Asst Prof	2	20%	128,345	16	75	32%	171,518	-33.6%
		Weighted Avg	10		146,827		233		189,490	-29.1%
School of Hospitality Bus Mgt 2220	52.0901 52.0904 52.0905	Professor	2	40%	142,724	4	27	41%	181,261	-27.0%
		Assoc Prof	3	60%	103,742	4	21	32%	144,639	-39.4%
		Asst Prof	0	0%		4	18	27%	125,809	
		Weighted Avg	5		119,335		66		154,485	-29.5%
Department of Management 2500	52.0201 52.0205 52.1301	Professor	4	40%	128,596	19	221	40%	198,966	-54.7%
		Assoc Prof	4	40%	123,247	19	174	31%	148,933	-20.8%
		Asst Prof	2	20%	113,650	18	163	29%	139,656	-22.9%
		Weighted Avg	10		123,467		558		166,039	-34.5%
Dept Mgmt Info Sys & Entrep 8595	52.1201 52.1701	Professor	1	25%	140,106	4	27	38%	183,616	-31.1%
		Assoc Prof	1	25%	120,013	4	25	35%	133,674	-11.4%
		Asst Prof	2	50%	125,300	3	20	28%	132,133	-5.5%
		Weighted Avg	4		127,680		72		151,974	-19.0%
Dept of Marketing & Intl Bus 7190	52.1401	Professor	5	50%	126,589	16	82	41%	190,340	-50.4%
		Assoc Prof	2	20%	125,265	16	54	27%	146,528	-17.0%
		Asst Prof	3	30%	121,929	15	66	33%	139,300	-14.2%
		Weighted Avg	10		124,926		202		161,951	-29.6%
College of Education		Professor	18	35%	93,273		192	35%	113,306	-21.5%
		Assoc Prof	19	37%	70,759		224	41%	77,535	-9.6%
		Asst Prof	15	29%	60,903		135	25%	65,688	-7.9%
		Weighted Avg	52		75,709		551		87,097	-15.0%
Ed Ldshp Sport Stu Ed/Co-Psy 3520	13.0401, 42.2801 31.0504	Professor	9	45%	92,757	11	69	31%	120,293	-29.7%
		Assoc Prof	6	30%	71,558	12	91	41%	79,483	-11.1%
		Asst Prof	5	25%	61,553	11	60	27%	66,259	-7.6%
		Weighted Avg								

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			Hdct.	Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	Rank		Avg Salary
	Weighted Avg		20		78,596		220		88,676	-12.8%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			% in		Avg Salary	Min. No. of Peer Inst*	% in			Avg Salary
			Hdct.	Rank			Hdct.	Rank		
Teaching and Learning 1750	13.0101, 13.1202, 13.1205 13.1001, 13.1206	Professor	9	28%	93,789	7	123	37%	109,386	-16.6%
		Assoc Prof	13	41%	70,390	6	133	40%	76,202	-8.3%
		Asst Prof	10	31%	60,578	6	75	23%	65,231	-7.7%
		Weighted Avg	32		73,905		331		86,048	-16.4%
Murrow College of Comm 1610	9.0101, 9.0102, 9.0401, 9.0402 9.0701, 9.0902, 9.0903	Professor	3	20%	112,662	11	150	34%	116,834	-3.7%
		Assoc Prof	6	40%	75,632	12	161	36%	81,561	-7.8%
		Asst Prof	6	40%	70,053	11	133	30%	68,729	1.9%
		Weighted Avg	15		80,806		444		89,634	-10.9%
College of Pharmacy		Professor	7	41%	145,552	100	43%	139,692	4.0%	
		Assoc Prof	5	29%	89,299	80	34%	95,632	-7.1%	
		Asst Prof	5	29%	82,312	54	23%	80,881	1.7%	
		Weighted Avg	17		110,407		234		111,057	-0.6%
Pharmaceutical Sciences 8314	51.2010	Professor	2	33%	180,125					
		Assoc Prof	2	33%	86,979					
		Asst Prof	2	33%	86,727					
		Weighted Avg	6		117,944					
Pharmacotherapy 8315, 8316	51.2001	Professor	4	67%	126,362	7	100	43%	139,692	-10.5%
		Assoc Prof	1	17%	91,283	6	80	34%	95,632	-4.8%
		Asst Prof	1	17%	84,011	7	54	23%	80,881	3.7%
		Weighted Avg	6		113,457		234		111,057	2.1%
Experimental & Sys Pharmacology 6560	26.1001	Professor	1	33%	153,164					
		Assoc Prof	1	33%	112,320					
		Asst Prof	1	33%	84,322					
		Weighted Avg	3		116,602					
University Totals		Professor	345	40%	116,438		12,509	48%	130,350	-11.9%
		Assoc Prof	312	36%	81,400		8,109	31%	93,203	-14.5%
		Asst Prof	214	25%	75,831		5,619	21%	85,331	-12.5%
		Top 3 ranks -->	871		93,910		26,237		109,228	-16.3%

\*When more than one CIP is used as a comparator, the largest number of Peers reporting for any 1 CIP for each rank is reported.

Number of Peers reporting is 22.

#### Notes:

WSU data were obtained from the January 31, 2014 RG2 Employee Appointment Download from HEPPS. Peer data are from the 2013-14 Oklahoma State University Faculty Salary Survey. WSU data are for tenured/tenure-track faculty; peer data are for tenured/tenure-track faculty when possible. Five peer institutions (Auburn, Ohio State, University of Illinois, North Carolina State and Virginia Tech) may have included non-tenure track faculty in the survey.

Salaries for faculty with 10 month appointments are converted to a 9 month equivalent by: monthly base salary\*9.

Salaries for faculty with 11/12 month appointments are converted to a 9 month equivalent by: monthly base salary\*term\* (9/11).

2010 CIP Codes are used.

Oklahoma State Faculty Salary survey criteria are used.

#### CRITERIA:

Active appointments as of January 31, 2014 with a payrate code of monthly are included.

Full-time faculty are included if their combined instructional and research FTE is .50 or more. Directors/chairs in academic units are included as instructional. Only Faculty with a tenure status code of T or P are included. Full-time is based on the full\_part='F', and only includes faculty with 1.0 FTE from all appointments and those on professional leave with less than 1.0 FTE. Regents' Professors are reported in the Professor rank.

Most departments are detailed by academic college.

College & university level details include instructional faculty fitting survey criteria even if departmental information is not submitted to OSU.

Split appointments are counted in all of the departments and areas to which they pertain.

Duplicate appointments within a department are deleted from department totals.

Duplicate appointments within an area are deleted from area totals.

Duplicate appointments within the university are deleted from university totals.

## Full-time Instructional Faculty Salaries - WSU and Legislative Peers, 2013-14

### Gap Between WSU & Peer Ranks Weighted by the WSU Rank Mix

By Area and Department (All salaries are reported on a 9-month basis)

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			Hdct.	% in Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	% in Rank		Avg Salary
College of Agricultural & Natural Res Sci	Human	Professor	76	45%	115,858		1,911	53%	119,375	-3.0%
		Assoc Prof	61	36%	81,554		998	27%	87,191	-6.9%
		Asst Prof	31	18%	81,462		724	20%	77,979	4.3%
		<b>Total</b>	<b>168</b>		<b>97,056</b>		<b>3633</b>		<b>\$102,284</b>	<b>-5.4%</b>
					Average with WSU rank mix			<b>\$100,050</b>	<b>-3.1%</b>	
School of Economic Sciences 1150	1.0103 45.0601	Professor	11	52%	132,323	19	400	56%	151,768	-14.7%
		Assoc Prof	4	19%	101,220	18	171	24%	110,966	-9.6%
		Asst Prof	6	29%	100,471	18	146	20%	100,484	-0.0%
		<b>Total</b>	<b>21</b>		<b>117,298</b>		<b>717</b>		<b>\$131,594</b>	<b>-12.2%</b>
					Average with WSU rank mix			<b>\$129,344</b>	<b>-10.3%</b>	
Biological Systems Engineering 1170	14.0301	Professor	5	38%	168,259	17	118	46%	123,719	26.5%
		Assoc Prof	4	31%	100,745	17	92	36%	90,955	9.7%
		Asst Prof	4	31%	89,618	15	46	18%	80,382	10.3%
		<b>Total</b>	<b>13</b>		<b>123,288</b>		<b>256</b>		<b>\$104,157</b>	<b>15.5%</b>
					Average with WSU rank mix			<b>\$100,303</b>	<b>18.6%</b>	
Crop and Soil Sciences 1200	1.1102 1.1201	Professor	12	50%	111,776	16	288	61%	109,292	2.2%
		Assoc Prof	7	29%	83,144	15	115	24%	83,607	-0.6%
		Asst Prof	5	21%	89,122	14	72	15%	73,663	17.3%
		<b>Total</b>	<b>24</b>		<b>98,705</b>		<b>475</b>		<b>\$97,673</b>	<b>1.0%</b>
					Average with WSU rank mix			<b>\$94,378</b>	<b>4.4%</b>	
Animal Sciences 1240	1.0901	Professor	8	62%	106,612	21	282	55%	111,070	-4.2%
		Assoc Prof	5	38%	87,110	20	132	26%	79,616	8.6%
		Asst Prof	0	0%		20	103	20%	71,379	
		<b>Total</b>	<b>13</b>		<b>99,111</b>		<b>517</b>		<b>\$95,132</b>	<b>4.0%</b>
					Average with WSU rank mix			<b>\$98,972</b>	<b>0.1%</b>	
Entomology 1840	26.0702 1.1105	Professor	9	64%	91,483	20	191	62%	101,517	-11.0%
		Assoc Prof	4	29%	71,394	19	71	23%	79,188	-10.9%
		Asst Prof	1	7%	79,000	19	47	15%	71,863	9.0%
		<b>Total</b>	<b>14</b>		<b>84,852</b>		<b>309</b>		<b>\$91,876</b>	<b>-8.3%</b>
					Average with WSU rank mix			<b>\$93,019</b>	<b>-9.6%</b>	
School of Food Science 1960	1.1001	Professor	4	50%	106,717	14	99	52%	115,827	-8.5%
		Assoc Prof	2	25%	77,252	13	57	30%	84,299	-9.1%
		Asst Prof	2	25%	70,849	12	36	19%	74,282	-4.8%
		<b>Total</b>	<b>8</b>		<b>90,384</b>		<b>192</b>		<b>\$98,677</b>	<b>-9.2%</b>
					Average with WSU rank mix			<b>\$97,559</b>	<b>-7.9%</b>	
Human Development 8345	19.0101 19.0701	Professor	0	0%		12	116	38%	123,947	
		Assoc Prof	9	75%	67,221	12	100	33%	84,377	-25.5%
		Asst Prof	3	25%	65,047	13	86	28%	74,783	-15.0%
		<b>Total</b>	<b>12</b>		<b>66,678</b>		<b>302</b>		<b>\$96,844</b>	<b>-45.2%</b>
					Average with WSU rank mix			<b>\$81,979</b>	<b>-22.9%</b>	
Horticulture 2210	1.1103	Professor	6	38%	105,726	14	179	58%	105,528	0.2%
		Assoc Prof	9	56%	88,986	14	89	29%	79,889	10.2%
		Asst Prof	1	6%	70,527	10	43	14%	68,936	2.3%
		<b>Total</b>	<b>16</b>		<b>94,110</b>		<b>311</b>		<b>\$93,131</b>	<b>1.0%</b>
					Average with WSU rank mix			<b>\$88,819</b>	<b>5.6%</b>	
Apparel Merch Design & Text 1600	19.0901	Professor	2	40%	87,824	7	26	31%	118,995	-35.5%
		Assoc Prof	2	40%	75,457	7	29	34%	77,355	-2.5%
		Asst Prof	1	20%	67,600	7	30	35%	66,447	1.7%
		<b>Total</b>	<b>5</b>		<b>78,832</b>		<b>85</b>		<b>\$86,242</b>	<b>-9.4%</b>
					Average with WSU rank mix			<b>\$91,829</b>	<b>-16.5%</b>	

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14				WSU Salary Lag/Lead	
			Hdct.	% in		Min. No. of Peer Inst*	Hdct.	% in			Avg Salary
				Rank	Avg Salary			Rank	Avg Salary		
Sch of Design & Const-CAHNS 8708	19.0601 50.0408 4.0601	Professor	0	0%		8	41	28%	104,541		
		Assoc Prof	3	60%	69,854	12	61	41%	78,569	-12.5%	
		Asst Prof	2	40%	61,483	11	47	32%	66,918	-8.8%	
		Total	5		66,506	Peer Rank Mix			\$82,040	-23.4%	
					Average with WSU rank mix				\$73,908	-11.1%	
Sch of the Environment-CAHNS 1990	3.0101 3.0506	Professor	4	33%	96,870	6	55	44%	110,644	-14.2%	
		Assoc Prof	7	58%	67,248	6	38	30%	86,887	-29.2%	
		Asst Prof	1	8%	64,500	5	33	26%	69,762	-8.2%	
		Total	12		76,893	Peer Rank Mix			\$92,772	-20.7%	
					Average with WSU rank mix				\$93,379	-21.4%	
Plant Pathology 2810	26.0305	Professor	10	71%	96,975	15	116	60%	107,171	-10.5%	
		Assoc Prof	2	14%	65,113	12	43	22%	75,263	-15.6%	
		Asst Prof	2	14%	54,920	11	35	18%	72,703	-32.4%	
		Total	14		86,415	Peer Rank Mix			\$93,880	-8.6%	
					Average with WSU rank mix				\$97,689	-13.0%	
Institute of Biological Chem 1140	26.0307 26.0308	Professor	3	38%	199,595	No Peer Data Available					
		Assoc Prof	3	38%	113,990						
		Asst Prof	2	25%	88,917						
		Total	8		139,824						
Voiland College of Engineering and Architecture		Professor	50	43%	134,104	2,681		50%	144,013	-7.4%	
		Assoc Prof	38	32%	93,269	1,686		31%	101,369	-8.7%	
		Asst Prof	29	25%	84,477	986		18%	88,346	-4.6%	
		Total	117		108,541	5353			\$120,328	-10.9%	
					Average with WSU rank mix				\$116,365	-7.2%	
School of Design & Const, CEA 1260	4.0201 15.1001	Professor	4	33%	92,736	14	114	34%	110,442	-19.1%	
		Assoc Prof	7	58%	75,025	14	138	41%	82,133	-9.5%	
		Asst Prof	1	8%	53,966	14	81	24%	67,505	-25.1%	
		Total	12		79,174	Peer Rank Mix			\$88,266	-11.5%	
					Average with WSU rank mix				\$90,350	-14.1%	
Chemical Engr & Bioengr 1520	14.0701 14.0501	Professor	6	38%	152,075	19	254	47%	148,266	2.5%	
		Assoc Prof	7	44%	101,808	19	159	29%	101,199	0.6%	
		Asst Prof	3	19%	90,400	17	130	24%	89,145	1.4%	
		Total	16		118,519	Peer Rank Mix			\$120,330	-1.5%	
					Average with WSU rank mix				\$116,589	1.6%	
Civil and Environmental Engrng 1590	14.0801 14.1401	Professor	11	52%	121,305	17	248	52%	135,178	-11.4%	
		Assoc Prof	5	24%	90,659	17	139	29%	99,081	-9.3%	
		Asst Prof	5	24%	83,039	16	93	19%	86,295	-3.9%	
		Total	21		104,897	Peer Rank Mix			\$115,254	-9.9%	
					Average with WSU rank mix				\$114,945	-9.6%	
School of Elect Eng & Comp Sci 1770	14.1001 11.0101 11.0701	Professor	14	48%	144,585	20	726	51%	148,320	-2.6%	
		Assoc Prof	11	38%	101,198	20	486	34%	105,212	-4.0%	
		Asst Prof	4	14%	97,428	20	212	15%	92,918	4.6%	
		Total	29		121,623	Peer Rank Mix			\$125,360	-3.1%	
					Average with WSU rank mix				\$124,327	-2.2%	
School of Mech & Mats Eng 2540	14.1801 14.1901	Professor	13	57%	133,186	19	439	52%	145,346	-9.1%	
		Assoc Prof	4	17%	98,422	19	228	27%	101,521	-3.1%	
		Asst Prof	6	26%	79,909	19	174	21%	89,024	-11.4%	
		Total	23		113,242	Peer Rank Mix			\$121,812	-7.6%	
					Average with WSU rank mix				\$123,031	-8.6%	
Engineering & Computer Science, WSU Vancouver (ENCS) 8603	11.0701, 14.1001, 14.1901	Professor	1	7%	144,549	20	900	52%	145,375	-0.6%	
		Assoc Prof	4	29%	86,557	20	536	31%	103,417	-19.5%	
		Asst Prof	9	64%	83,547	20	296	17%	90,671	-8.5%	
		Total				Peer Rank Mix					

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead
			Hdct.	% in Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	% in Rank	
		Total					Peer Rank Mix	\$123,041	-38.6%
			14		88,764		1,732		
							Average with WSU rank mix	<b>\$98,220</b>	<b>-10.7%</b>

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14				WSU Salary Lag/Lead	
			Hdct.	% in		Min. No. of Peer Inst*	Hdct.	% in			Avg Salary
				Rank	Avg Salary			Rank	Avg Salary		
College of Nursing 0006	51.3801	Professor	2	6%	94,175	8	48	24%	119,658	-27.1%	
		Assoc Prof	10	32%	82,351	9	86	42%	94,025	-14.2%	
		Asst Prof	19	61%	68,600	9	69	34%	77,705	-13.3%	
		<b>Total</b>	<b>31</b>		<b>74,686</b>				Peer Rank Mix \$94,539	-26.6%	
						Average with WSU rank mix			<b>\$85,676</b>	<b>-14.7%</b>	
College of Medical Sciences		Professor	4	27%	109,408		35	35%	119,548	-9.3%	
		Assoc Prof	7	47%	87,317		35	35%	81,132	7.1%	
		Asst Prof	4	27%	82,457		31	31%	67,347	18.3%	
		<b>Total</b>	<b>15</b>		<b>91,912</b>				Peer Rank Mix \$90,213	1.8%	
						Average with WSU rank mix			<b>\$87,700</b>	<b>4.6%</b>	
Medical Sciences 1360, 8632		Professor	1	13%	80,257	No Peer Data Available					
		Assoc Prof	5	63%	92,033						
		Asst Prof	2	25%	82,234						
<b>Total</b>	<b>8</b>		<b>88,111</b>								
Speech and Hearing Sciences 3150	51.0201, 51.0202 51.0203, 51.0204	Professor	1	25%	117,858	7	33	35%	118,071	-0.2%	
		Assoc Prof	2	50%	75,527	9	32	34%	80,131	-6.1%	
		Asst Prof	1	25%	76,960	9	29	31%	66,370	13.8%	
		<b>Total</b>	<b>4</b>		<b>86,468</b>				Peer Rank Mix \$89,205	-3.2%	
						Average with WSU rank mix			<b>\$86,176</b>	<b>0.3%</b>	
Health Policy & Administration 8543, 8343	51.0701	Professor	2	67%	119,759	2	2	29%	143,924	-20.2%	
		Assoc Prof	0	0%		2	3	43%	91,809		
		Asst Prof	1	33%	88,400	2	2	29%	81,510	7.8%	
		<b>Total</b>	<b>3</b>		<b>109,306</b>				Peer Rank Mix \$103,756	5.1%	
						Average with WSU rank mix			<b>\$123,119</b>	<b>-12.6%</b>	
College of Arts and Sciences		Professor	118	38%	98,729		4,474	49%	120,475	-22.0%	
		Assoc Prof	121	39%	69,968		2,867	31%	80,094	-14.5%	
		Asst Prof	70	23%	62,560		1,848	20%	69,380	-10.9%	
		<b>Total</b>	<b>309</b>		<b>79,273</b>				Peer Rank Mix \$97,600	-23.1%	
						Average with WSU rank mix			<b>\$93,087</b>	<b>-17.4%</b>	
School of Biological Sciences 8434, 1440, 3610, 1400	26.0101, 26.0301, 26.0701 26.0804, 51.1102	Professor	10	32%	98,168	12	400	52%	127,355	-29.7%	
		Assoc Prof	14	45%	77,351	11	215	28%	81,707	-5.6%	
		Asst Prof	7	23%	69,840	12	148	19%	72,692	-4.1%	
		<b>Total</b>	<b>31</b>		<b>82,370</b>				Peer Rank Mix \$103,889	-26.1%	
						Average with WSU rank mix			<b>\$94,397</b>	<b>-14.6%</b>	
Chemistry 1540	40.0501	Professor	14	61%	124,814	19	357	59%	137,909	-10.5%	
		Assoc Prof	5	22%	83,853	19	127	21%	85,006	-1.4%	
		Asst Prof	4	17%	74,879	19	119	20%	75,004	-0.2%	
		<b>Total</b>	<b>23</b>		<b>107,225</b>				Peer Rank Mix \$114,353	-6.6%	
						Average with WSU rank mix			<b>\$115,468</b>	<b>-7.7%</b>	
School of the Environment-CAS 8626	4.0301, 40.0601 3.0104	Professor	7	54%	97,412	19	200	55%	115,479	-18.5%	
		Assoc Prof	3	23%	76,107	18	85	24%	82,727	-8.7%	
		Asst Prof	3	23%	63,440	17	76	21%	69,552	-9.6%	
		<b>Total</b>	<b>13</b>		<b>84,656</b>				Peer Rank Mix \$98,098	-15.9%	
						Average with WSU rank mix			<b>\$97,322</b>	<b>-15.0%</b>	
Physics and Astronomy 2790	40.0801 40.0201	Professor	9	60%	116,020	21	555	66%	126,401	-8.9%	
		Assoc Prof	4	27%	80,878	21	181	21%	88,427	-9.3%	
		Asst Prof	2	13%	73,101	21	111	13%	76,579	-4.8%	
		<b>Total</b>	<b>15</b>		<b>100,926</b>				Peer Rank Mix \$111,757	-10.7%	
						Average with WSU rank mix			<b>\$109,631</b>	<b>-8.6%</b>	
Mathematics 2530	27.0101 27.0301 27.0501	Professor	17	52%	86,686	22	778	58%	122,361	-41.2%	
		Assoc Prof	8	24%	73,832	22	330	24%	86,827	-17.6%	
		Asst Prof	8	24%	65,471	21	243	18%	76,533	-16.9%	
		<b>Total</b>							Peer Rank Mix \$105,438	-34.4%	



Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead
			Hdct.	% in Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	% in Rank	
		Total	33		78,427		1,351		
						Average with WSU rank mix		\$102,637	-30.9%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14				WSU Salary Lag/Lead	
			Hdct.	% in		Min. No. of Peer Inst*	Hdct.	% in			Avg Salary
				Rank	Avg Salary			Rank	Avg Salary		
Anthropology 1250	45.0201 45.0301	Professor	3	17%	97,280	17	95	37%	109,434	-12.5%	
		Assoc Prof	9	50%	71,391	17	90	35%	79,014	-10.7%	
		Asst Prof	6	33%	61,549	17	69	27%	65,129	-5.8%	
		Total	18		72,425	254			\$86,620	-19.6%	
			Average with WSU rank mix					\$79,456	-9.7%		
Crit Culture/Gndr/Race Studies 8683	5.0200	Professor	2	18%	84,423	10	42	31%	124,020	-46.9%	
		Assoc Prof	9	82%	66,031	8	53	39%	89,897	-36.1%	
		Asst Prof	0	0%		7	41	30%	67,860		
		Total	11		69,375	136			\$93,791	-35.2%	
			Average with WSU rank mix					\$96,101	-38.5%		
English 1830	10.0105, 16.0104, 23.0101, 23.0401 23.1302, 23.1303, 24.0103	Professor	10	29%	89,662	22	435	44%	108,406	-20.9%	
		Assoc Prof	17	49%	68,467	22	371	38%	73,963	-8.0%	
		Asst Prof	8	23%	58,687	21	173	18%	62,168	-5.9%	
		Total	35		72,287	979			\$87,183	-20.6%	
			Average with WSU rank mix					\$81,108	-12.2%		
Fine Arts 1940	50.0702 50.0703	Professor	3	20%	81,140	6	54	34%	93,239	-14.9%	
		Assoc Prof	7	47%	60,886	6	66	42%	76,356	-25.4%	
		Asst Prof	5	33%	56,328	5	39	25%	60,046	-6.6%	
		Total	15		63,417	159			\$78,089	-23.1%	
			Average with WSU rank mix					\$74,296	-17.2%		
Foreign Languages & Cultures 1980	16.0101, 16.0301, 16.0501 16.0901, 16.0905	Professor	3	30%	75,040	14	177	32%	100,260	-33.6%	
		Assoc Prof	3	30%	65,893	13	245	44%	71,378	-8.3%	
		Asst Prof	4	40%	57,106	14	130	24%	60,102	-5.2%	
		Total	10		65,122	552			\$77,984	-19.7%	
			Average with WSU rank mix					\$75,532	-16.0%		
History 2160	54.0101, 54.0102, 54.0103 54.0105, 54.0106, 5.0103	Professor	8	36%	112,264	21	265	41%	111,018	1.1%	
		Assoc Prof	10	45%	63,445	21	258	40%	76,437	-20.5%	
		Asst Prof	4	18%	54,600	19	120	19%	63,232	-15.8%	
		Total	22		79,589	643			\$88,224	-10.8%	
			Average with WSU rank mix					\$86,611	-8.8%		
School of Music 2590	50.0901, 50.0903, 50.0904 13.1312	Professor	4	25%	84,282	15	247	42%	92,769	-10.1%	
		Assoc Prof	6	38%	55,638	15	211	36%	70,050	-25.9%	
		Asst Prof	6	38%	51,383	15	125	21%	59,407	-15.6%	
		Total	16		61,203	583			\$77,393	-26.5%	
			Average with WSU rank mix					\$71,738	-17.2%		
Criminal Justice & Criminology 1710	43.0103, 43.0104, 43.0107	Professor	4	33%	91,375	1	11	44%	142,886	-56.4%	
		Assoc Prof	4	33%	66,334	1	10	40%	87,655	-32.1%	
		Asst Prof	4	33%	64,520	2	4	16%	76,645	-18.8%	
		Total	12		74,076	25			\$110,195	-48.8%	
			Average with WSU rank mix					\$102,395	-38.2%		
Politics Phisphy & Pub Affrs 8697	45.1001 38.0101, 38.0103, 44.0501	Professor	7	37%	80,167	21	330	41%	124,809	-55.7%	
		Assoc Prof	8	42%	70,012	21	280	35%	82,512	-17.9%	
		Asst Prof	4	21%	63,232	21	201	25%	68,881	-8.9%	
		Total	19		72,326	811			\$96,344	-33.2%	
			Average with WSU rank mix					\$95,225	-31.7%		
Psychology 2900	42.0101 42.2801	Professor	10	45%	103,939	21	348	49%	132,624	-27.6%	
		Assoc Prof	9	41%	68,846	21	204	29%	83,379	-21.1%	
		Asst Prof	3	14%	69,396	21	157	22%	73,894	-6.5%	
		Total	22		84,872	709			\$105,450	-24.2%	
			Average with WSU rank mix					\$104,470	-23.1%		
Sociology 3120	45.1101	Professor	6	40%	90,981	20	180	44%	124,270	-36.6%	
		Assoc Prof	6	40%	77,280	19	141	34%	81,837	-5.9%	
		Asst Prof	3	20%	65,926	20	92	22%	69,647	-5.6%	
		Total				Peer Rank Mix			\$97,615	-21.3%	

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead
			Hdct.	% in Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	% in Rank	
		Total	15		80,490		413		
						Average with WSU rank mix		\$96,372	-19.7%

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14				WSU Salary Lag/Lead	
			Hdct.	% in		Min. No. of Peer Inst*	Hdct.	% in			Avg Salary
				Rank	Avg Salary			Rank	Avg Salary		
College of Veterinary Medicine		Professor	45	45%	141,090		2,203	47%	122,996	12.8%	
		Assoc Prof	34	34%	90,830		1,427	30%	95,367	-5.0%	
		Asst Prof	22	22%	81,650		1,057	23%	86,233	-5.6%	
		<b>Total</b>	<b>101</b>		<b>111,223</b>		<b>4687</b>		<b>\$106,293</b>	4.4%	
						Average with WSU rank mix			<b>\$105,687</b>	<b>5.0%</b>	
Sch of Molecular Biosciences 8433	26.0202, 26.0203, 26.0406 26.0502, 26.0804, 26.0805 26.1201, 26.0210	Professor	14	50%	145,799	13	280	53%	132,171	9.3%	
		Assoc Prof	8	29%	80,283	12	135	26%	82,639	-2.9%	
		Asst Prof	6	21%	71,939	13	111	21%	73,519	-2.2%	
		<b>Total</b>	<b>28</b>		<b>111,253</b>		<b>526</b>		<b>\$107,081</b>	3.7%	
						Average with WSU rank mix			<b>\$105,451</b>	<b>5.2%</b>	
Integrative Physiology & Neuro 3420	51.2401, 51.2502 51.2503, 51.2506	Professor	5	25%	139,474	13	408	46%	121,245	13.1%	
		Assoc Prof	10	50%	88,536	12	284	32%	95,269	-7.6%	
		Asst Prof	5	25%	80,352	12	189	21%	86,893	-8.1%	
		<b>Total</b>	<b>20</b>		<b>99,225</b>		<b>881</b>		<b>\$105,502</b>	-6.3%	
						Average with WSU rank mix			<b>\$99,669</b>	<b>-0.4%</b>	
Vet Clin Sci 3460	51.2401, 51.2501 51.2507, 51.2508	Professor	13	41%	124,601	13	573	46%	122,164	2.0%	
		Assoc Prof	14	44%	96,235	12	382	31%	97,609	-1.4%	
		Asst Prof	5	16%	90,768	12	292	23%	88,383	2.6%	
		<b>Total</b>	<b>32</b>		<b>106,904</b>		<b>1,247</b>		<b>\$106,732</b>	0.2%	
						Average with WSU rank mix			<b>\$106,143</b>	<b>0.7%</b>	
Veterinary Microbiology & Path 3490	51.2401, 51.2504 51.2505, 51.2511	Professor	9	56%	120,742	13	421	47%	121,113	-0.3%	
		Assoc Prof	2	13%	106,643	12	279	31%	95,759	10.2%	
		Asst Prof	5	31%	83,519	12	197	22%	86,903	-4.1%	
		<b>Total</b>	<b>16</b>		<b>107,347</b>		<b>897</b>		<b>\$105,714</b>	1.5%	
						Average with WSU rank mix			<b>\$107,253</b>	<b>0.1%</b>	
Global Animal Health, Paul G. Allen 8670	51.2401, 51.2501 51.2504, 51.2511	Professor	3	75%	252,167	13	521	46%	121,874	51.7%	
		Assoc Prof	0	0%	0	12	347	31%	97,614		
		Asst Prof	1	25%	91,473	12	268	24%	88,198	3.6%	
		<b>Total</b>	<b>4</b>		<b>211,994</b>		<b>1,136</b>		<b>\$106,519</b>	49.8%	
						Average with WSU rank mix			<b>\$113,455</b>	<b>46.5%</b>	
Carson College of Business		Professor	21	42%	132,458		715	39%	200,254	-51.2%	
		Assoc Prof	16	32%	127,934		545	30%	152,418	-19.1%	
		Asst Prof	13	26%	130,658		582	32%	149,000	-14.0%	
		<b>Total</b>	<b>50</b>		<b>130,542</b>		<b>1842</b>		<b>\$169,907</b>	-30.2%	
						Average with WSU rank mix			<b>\$171,621</b>	<b>-31.5%</b>	
Accounting 1060	52.0301 52.0201	Professor	4	36%	126,551	19	254	36%	204,484	-61.6%	
		Assoc Prof	3	27%	121,049	19	217	31%	153,854	-27.1%	
		Asst Prof	4	36%	149,545	19	240	34%	154,122	-3.1%	
		<b>Total</b>	<b>11</b>		<b>133,412</b>		<b>711</b>		<b>\$172,032</b>	-28.9%	
						Average with WSU rank mix			<b>\$172,363</b>	<b>-29.2%</b>	
Dept of Finance & Mgmt Science 1460	52.0801 52.1501 52.1701	Professor	5	50%	140,506	16	104	45%	209,728	-49.3%	
		Assoc Prof	3	30%	169,682	15	54	23%	175,473	-3.4%	
		Asst Prof	2	20%	128,345	16	75	32%	171,518	-33.6%	
		<b>Total</b>	<b>10</b>		<b>146,827</b>		<b>233</b>		<b>\$189,490</b>	-29.1%	
						Average with WSU rank mix			<b>\$191,810</b>	<b>-30.6%</b>	
School of Hospitality Bus Mgt 2220	52.0901 52.0904 52.0905	Professor	2	40%	142,724	4	27	41%	181,261	-27.0%	
		Assoc Prof	3	60%	103,742	4	21	32%	144,639	-39.4%	
		Asst Prof	0	0%		4	18	27%	125,809		
		<b>Total</b>	<b>5</b>		<b>119,335</b>		<b>66</b>		<b>\$154,485</b>	-29.5%	
						Average with WSU rank mix			<b>\$159,288</b>	<b>-33.5%</b>	
Department of Management 2500	52.0201	Professor	4	40%	128,596	19	221	40%	198,966	-54.7%	
		Assoc Prof	4	40%	123,247	19	174	31%	148,933	-20.8%	
		Asst Prof	2	20%	113,650	18	163	29%	139,656	-22.9%	

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead
			Hdct.	% in Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	% in Rank	
	52.0205 52.1301								
		Total					Peer Rank Mix	\$166,039	-34.5%
			10		123,467		558		
						Average with WSU rank mix		<b>\$167,091</b>	<b>-35.3%</b>

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14				WSU Salary Lag/Lead	
			Hdct.	% in		Min. No. of Peer Inst*	Hdct.	% in			Avg Salary
				Rank	Avg Salary			Rank	Avg Salary		
Dept Mgmt Info Sys & Entrep 8595	52.1201 52.1701	Professor	1	25%	140,106	4	27	38%	183,616	-31.1%	
		Assoc Prof	1	25%	120,013	4	25	35%	133,674	-11.4%	
		Asst Prof	2	50%	125,300	3	20	28%	132,133	-5.5%	
		Total	4		127,680	Peer Rank Mix			\$151,974	-19.0%	
			Average with WSU rank mix		72			\$145,389	-13.9%		
Dept of Marketing & Intl Bus 7190	52.1401	Professor	5	50%	126,589	16	82	41%	190,340	-50.4%	
		Assoc Prof	2	20%	125,265	16	54	27%	146,528	-17.0%	
		Asst Prof	3	30%	121,929	15	66	33%	139,300	-14.2%	
		Total	10		124,926	Peer Rank Mix			\$161,951	-29.6%	
			Average with WSU rank mix		202			\$166,266	-33.1%		
College of Education		Professor	18	35%	93,273		192	35%	113,306	-21.5%	
		Assoc Prof	19	37%	70,759		224	41%	77,535	-9.6%	
		Asst Prof	15	29%	60,903		135	25%	65,688	-7.9%	
		Total	52		75,709	Peer Rank Mix			\$87,097	-15.0%	
			Average with WSU rank mix		551			\$86,500	-14.3%		
Ed Ldshp Sport Stu Ed/Co-Psy 3520	13.0401, 42.2801 31.0504	Professor	9	45%	92,757	11	69	31%	120,293	-29.7%	
		Assoc Prof	6	30%	71,558	12	91	41%	79,483	-11.1%	
		Asst Prof	5	25%	61,553	11	60	27%	66,259	-7.6%	
		Total	20		78,596	Peer Rank Mix			\$88,676	-12.8%	
			Average with WSU rank mix		220			\$94,541	-20.3%		
Teaching and Learning 1750	13.0101, 13.1202, 13.1205 13.1001, 13.1206	Professor	9	28%	93,789	7	123	37%	109,386	-16.6%	
		Assoc Prof	13	41%	70,390	6	133	40%	76,202	-8.3%	
		Asst Prof	10	31%	60,578	6	75	23%	65,231	-7.7%	
		Total	32		73,905	Peer Rank Mix			\$86,048	-16.4%	
			Average with WSU rank mix		331			\$82,107	-11.1%		
Murrow College of Comm 1610	9.0101, 9.0102, 9.0401, 9.0402 9.0701, 9.0902, 9.0903	Professor	3	20%	112,662	11	150	34%	116,834	-3.7%	
		Assoc Prof	6	40%	75,632	12	161	36%	81,561	-7.8%	
		Asst Prof	6	40%	70,053	11	133	30%	68,729	1.9%	
		Total	15		80,806	Peer Rank Mix			\$89,634	-10.9%	
			Average with WSU rank mix		444			\$83,483	-3.3%		
College of Pharmacy		Professor	7	41%	145,552		100	43%	139,692	4.0%	
		Assoc Prof	5	29%	89,299		80	34%	95,632	-7.1%	
		Asst Prof	5	29%	82,312		54	23%	80,881	1.7%	
		Total	17		110,407	Peer Rank Mix			\$111,057	-0.6%	
			Average with WSU rank mix		234			\$109,436	0.9%		
Pharmaceutical Sciences 8314	51.2010	Professor	2	33%	180,125						
		Assoc Prof	2	33%	86,979						
		Asst Prof	2	33%	86,727						
		Total	6		117,944	No Peer Data Available					
Pharmacotherapy 8315, 8316	51.2001	Professor	4	67%	126,362	7	100	43%	139,692	-10.5%	
		Assoc Prof	1	17%	91,283	6	80	34%	95,632	-4.8%	
		Asst Prof	1	17%	84,011	7	54	23%	80,881	3.7%	
		Total	6		113,457	Peer Rank Mix			\$111,057	2.1%	
			Average with WSU rank mix		234			\$122,547	-8.0%		
Experimental & Sys Pharmacology 6560	26.1001	Professor	1	33%	153,164						
		Assoc Prof	1	33%	112,320						
		Asst Prof	1	33%	84,322						
		Total	3		116,602	No Peer Data Available					

Dept	CIP comparator(s)	Rank	WSU--Spring 2014			Peer 2013-14			WSU Salary Lag/Lead	
			Hdct.	% in Rank	Avg Salary	Min. No. of Peer Inst*	Hdct.	% in Rank		Avg Salary
University Totals		Professor	345	40%	116,438		12,509	48%	130,350	-11.9%
		Assoc Prof	312	36%	81,400		8,109	31%	93,203	-14.5%
		Asst Prof	214	25%	75,831		5,619	21%	85,331	-12.5%
		Total	871		93,910		26,237			
						Peer Rank Mix		\$109,228	-16.3%	
						Average with WSU rank mix		\$105,983	-12.9%	

\*When more than one CIP is used as a comparator, the largest number of Peers reporting for any 1 CIP for each rank is reported.

Number of Peers reporting is 22.

# WSU Foundation Report

Oct 27, 2014

The Washington State University Foundation is an institutionally affiliated non-profit with its sole purpose being the encouragement of individual, corporate, and foundation philanthropy toward the mission of Washington State University. Managing an endowment of \$415 million, and nearing the milestone of its first billion dollar comprehensive campaign, the Foundation's efforts have directed financial resources directly to operational, facility, and student and faculty needs.

With the silent phase of the campaign begun in late 2006, as of September of 2014 the Foundation has received over \$944 million. A considerable investment has come directly from individual alumni, who account for nearly one-third of the total thus far. But Washington State University's mission is appealing to others as well, with non-alumni, and gift/grant making corporations and foundations accounting for the rest.

As successful as the campaign has been in tallying receipts, the real story is how the campaign has impacted Washington State University. Philanthropy has enabled schools to form, programs to expand, and make excellence become within reach. Just three examples include:

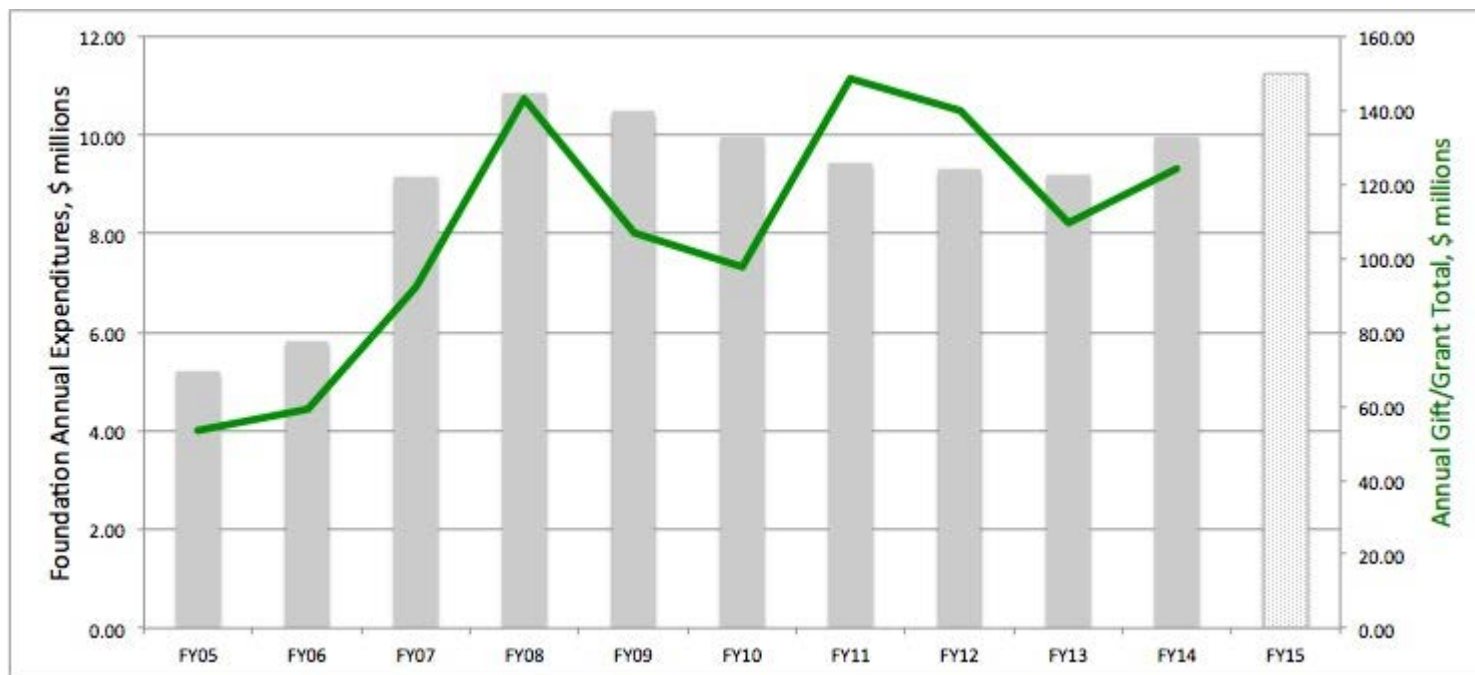
- The Paul Allen School for Global Animal Health was created through the generosity of over \$50 million from the Bill & Melinda Gates Foundation and Paul G. Allen, among others. These gifts not only completed a state-of-the-art facility in Pullman, but also established research and outreach programs in Sub-Saharan Africa, increasing the number of graduate students and research activity directly in the region.
- Washington's apple, pear, cherry and stone fruit growers have joined the campaign by taxing themselves for over \$32 million in direct financial support of Washington State University's research and extension effort that benefits the entire industry. The majority of these commitments are intended to establish several endowed faculty chair positions focused on research and development.
- The Voiland School of Chemical Engineering and Bioengineering was created by a gift of over \$17 million by Gene and Linda Voiland. This commitment allowed the program to focus on being a research leader in catalysis, recruiting new faculty to the existing team. Already it has leveraged more than twice the amount of federal funding from several agencies in pursuit of a sustainable energy future.

Across all programs, in dollar terms, the campaign has invested over half a billion dollars to date directly into operational support for faculty in achieving their teaching, research, and service missions. And, in growing the endowment, already created over 573 individual endowment agreements; nearly 400 in student and graduate support, 115 in ongoing operational support, 27 for faculty and 27 for research.

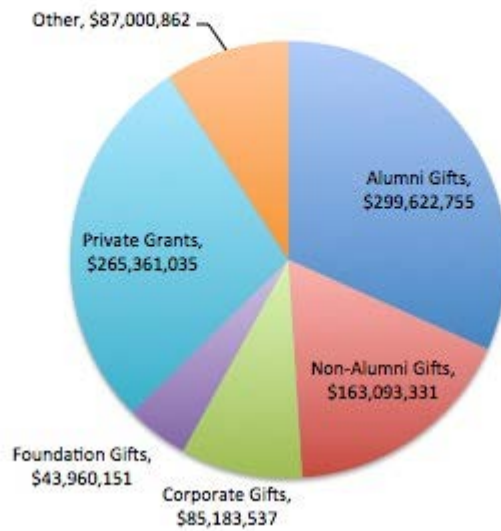
Over the past decade, the Washington State University Foundation has doubled its annual receipts of gifts, grants, and pledges, from \$50 to over \$100 million annually. With expenditures near \$10 million for FY14, the Foundation's activities have returned at least \$12 for every \$1 expended on behalf of Washington State University. It was only through the belief in Washington State University's mission and the generosity of our donors that our campaign has been successful through a deep recession which limited the Foundation's activities in recent years.



While 2015 will mark the 125th year of Washington State Univeristy and completion of the current billion dollar campaign, it marks only the beginning of what the power of philanthropy can do for our institution, both recognizing and supporting excellence in research and allied efforts across the institution.



### Sources of Campaign Funds as of Sept 30, 2014



### Uses of Campaign Funds as of Sept 30, 2014

