Broader Impacts
Towards a Strategic Approach for Oregon State University

4/24/2013
Oregon State University
Center for Research on Lifelong STEM Learning
# Contents

What are “Broader Impacts”? ......................................................................................................................... 2

Workshop Outcomes ........................................................................................................................................ 4

Opportunities .................................................................................................................................................. 4

   Supporting OSU’s Mission as Land Grant University ...................................................................................... 4
   Positioning OSU for Success ............................................................................................................................ 4
   Supporting OSU Strategic Plan and Research Agenda .................................................................................... 4

Challenges ....................................................................................................................................................... 5

   Culture and Reward ..................................................................................................................................... 5
   Capacity and Tradeoffs ................................................................................................................................. 5
   Connections and Maximizing Existing Capacity .......................................................................................... 5

Moving Forward ........................................................................................................................................... 7

   A Vision Statement ...................................................................................................................................... 7
   Integrating Scholarship into Broader Impacts ............................................................................................... 7
   Promotion and Tenure .................................................................................................................................. 8
   Outreach and Engagement ............................................................................................................................ 8
   Tools for Support ......................................................................................................................................... 8

Action Plan .................................................................................................................................................... 9

   Defining Broader Impacts for OSU .................................................................................................................. 10
   Conduct a “SWOT” Analysis .......................................................................................................................... 10
   Institutionalizing a Commitment to Broader Impacts at OSU ..................................................................... 10
   Develop an Implementation Strategy: Both short and long-term to spark a culture shift ....................... 12

Appendix I: Workshop Materials .................................................................................................................. 13

Appendix II: Workshop Participant List ...................................................................................................... 21

Appendix III: Initial “Sweep” of Broader Impacts Capacity at OSU ................................................................. 23

Appendix IV: Participant Comments on Report Draft .................................................................................. 27
The OSU Center for Research for Lifelong STEM Learning with support from the OSU Research Office and in collaboration with OSU Outreach and Engagement, convened a “Broader Impacts Invitational Workshop” on December 7, 2012. The workshop solicited opinions and perspectives from 65 participating faculty who were broadly representative of OSU’s diverse disciplines and units. The goals of the workshop were: 1) to move OSU towards a more strategic and intellectually rigorous approach to broader impacts; one that will measurably improve the competitiveness of OSU initiated proposals; and 2) identify the specific tools and supports investigators and units need to effectively design, implement and evaluate quality broader impacts efforts. This report describes the challenges and opportunities associated with these goals. It also recommends a path forward for consideration by OSU’s leadership.

What are “Broader Impacts”?

“Broader Impacts” is the term used by the National Science Foundation (NSF) when referencing the greater purpose and impact of research. Broader impacts can be described as the societal benefit provided by and/or linked to research spending. Broader impacts include:

- Communicating research to diverse publics in order to build a more scientifically literate and technically competent society.
- Training the next generation of professionals and academics especially in fields of science, technology, engineering, and mathematics.
- Broadening the participation of underrepresented groups.
- Creating innovative new business opportunities.
- Other strategies for advancing society’s health & well-being.

More than 15 years ago the NSF began requiring that a broader impact statement accompany the intellectual merit narrative of all proposals. This change allowed the concept of broader impacts to slowly seep into the collective awareness of investigators who were previously able to operate separate from societal outcomes and focus exclusively on answering fundamental research questions and contributing to the knowledge base of the research community. It also validated those investigators who were already adding value to their research through communication, training, outreach, inclusion or other means. In practice broader impacts work remains ad hoc, and in some instances, nonexistent. There are, of course, many exceptions and from them we can learn how to improve the impact of our research and adapt to increasingly rigorous guidelines of the NSF and an increasing number of other funding agencies, both federal and private.

In November 2012 the NSF updated their proposal guidelines (Appendix I). The new guidelines reaffirm their commitment to the importance of making high quality broader impacts central to every proposal. Broader impact is now to be equally as important a basis for selection as is intellectual merit. There are
also discussions among some divisions of including broader impacts experts on review panels. As review becomes more rigorous the expectations for proposed broader impacts activities expand to include:

- Efforts that suggest and explore creative, original, or potentially transformative concepts.
- A clear plan for carrying out the proposed activities based on a sound rationale and research.
- A mechanism for assessing success.
- A qualified individual, team, or organization to conduct the proposed activities.
- Sufficient resources to carry out proposed activities.
- Efforts that can be aggregated and/or are part of an institution wide-effort.

It is important to acknowledge that “broader impact” is an NSF-specific term. Although the NSF provides a significant percentage of OSU’s external research support, currently more than 30%, there are many investigators on campus who do not receive NSF funding. That said, the ideal underlying the term broader impacts has wide meaning and relevance for all OSU researchers. The Department of Agriculture, the second largest external funder of OSU research providing 20% of our support, emphasizes applied efforts that promote economic stability, teaching and learning, human capital, and community outcomes. The Department of Health and Human Services (inclusive of the National Institutes of Health or NIH) is another major funder, at 13% of external funding awarded primarily to the Colleges of Pharmacy, Public Health and Human Sciences, and Veterinary Medicine. NIH tends to manage programs areas and generate calls for proposals based on specific needs for information (i.e. society needs to better understand obesity in children so we can improve health and prevent associated disease…) therefore the “broader impact” tends to be integrated into the proposal process and research outcomes are slated for an application that will provide a benefit to society. These major sources of federal funds to OSU may approach generating a positive benefit for society differently; however, institutionalization and improved tools and capacity towards this end can benefit investigators seeking funds from all sources.
Workshop Outcomes

The December 7 workshop was organized to allow participants to grapple with the issues surrounding broader impacts efforts at OSU. The morning hours were devoted to defining the current opportunities and challenges of designing and implementing broader impacts efforts at OSU. The afternoon hours were spent trying to envision scenarios for moving forward, defining strategies for the future of OSU broader impact efforts. Results are synthesized below in categories which are a reflection of both the structure of the workshop and the emphasis participants placed on certain topics.

Opportunities

Despite breaking into multiple small groups, there was a striking unanimity of opinion around the current opportunities for broader impacts at OSU; these fell within three broad categories: 1) Supporting OSU’s Mission as a Land Grant University; 2) Positioning OSU for Success; and 3) Supporting the OSU Strategic Plan and Research Agenda.

Supporting OSU’s Mission as Land Grant University

Efforts to improve in the area of broader impacts can solidify and expand OSU’s mission as a land grant institution to serve a broader community. Greater emphasis on broader impacts can serve as an invitation to a range of external stakeholders to engage in true partnerships with the university; aligning our strengths and mission with real and positive changes in the broader community. Broader impacts represent an important vehicle for efforts to improve the public’s capacity to make informed decisions on myriad issues vital to the health and wellbeing of Oregon, the nation and the world.

Positioning OSU for Success

OSU can and should take a proactive stance in defining what success in broader impacts means; including how efforts in achieving broader impacts are valued by the university, not just for outreach and engagement faculty but for investigators as well. This active role transcends what we do for our own institution but should include demonstrating leadership for funding agencies like NSF who, though committed to the concept of broader impacts remain uncertain as how best to implement the concept. In the short and mid-term this can give OSU a competitive edge with certain funding organizations by bringing significant demonstrated capacity to delivering real impacts for research dollars.

Supporting OSU Strategic Plan and Research Agenda

Improvements in connecting intellectual merit and broader impacts will directly help OSU faculty be more effective in achieving the university’s strategic goal – supporting the health of our planet, people, and economy – and the specific values and principles of the university’s Research Agenda, including relevance, integration, collaboration, leadership, and accessibility. In particular, enhanced broader impact efforts can better position OSU to help the public address and overcome a range of polarizing and controversial issues that currently prevent real progress and improvement.
Challenges
Challenges exist and should not be ignored. Workshop participants identified three major areas of challenge. In order of emphasis they are culture, capacity, and connection.

Culture and Reward
An overwhelming number of comments and discussions surfaced around the university culture to value discipline specific scholarship published in a narrow set of outlets over generating positive impacts, engaging the public in research, and the types of collaborative approaches that make for successful broader impacts. This mindset is expressed at all levels from individual faculty, to departments, and colleges. This culture most strongly manifests itself as a barrier in evaluation and promotion and tenure processes. Participants were divided on the intractability of the institutional cultural mindset. Many participants expressed the concern that culture shift is impossible; while others emphasized that both small and large shifts to include reward and recognition for success with broader impacts are imperative to the institution’s survival. Overcoming this challenge can add value to OSU by increasing our positive impact on society and thereby improving how OSU is perceived by the public. It was suggested that faculty should be given incentives, including tenure, for building partnerships, publishing in sources outside of their disciplines, and putting more energy into making the world a better place; doing so would increase the visibility of OSU and how OSU is valued by stakeholders. Such incentives are likely to be most effective with early career faculty as they are most driven by promotion and tenure processes and, with limited external funds, would most benefit from the competitive edge that well designed broader impacts could bring. With over 70 percent of OSU research dollars coming from federal sources, and oversight and accountability becoming ever more stringent, it makes sense for OSU to alter its reward structures and practices to support our success in these areas.

Capacity and Tradeoffs
Lack of time, expertise, budget, and appropriate partners were all cited as barriers to enhancing broader impacts. For example, participants aptly recognized that dedication of time and resources to broader impacts implies a direct tradeoff with research and teaching and that currently, there is a lack of guidance on how to allocate sufficient time and dollars towards broader impacts relevant to other duties required of faculty. Further, it is generally unknown how much time and money is needed to produce quality results in the area of broader impacts. Additionally, some faculty expressed concern that conducting broader impacts oriented work, especially if it is done with scholarly intent, would involve Institutional Review Board IRB compliance – a concept that can be petrifying to investigators outside of social and health sciences. While everyone agreed that support infrastructures should be created in ways that streamline processes and doesn’t unnecessarily encumber faculty time, it was noted that generating the support needed to overcome these challenges could have the negative impact of introducing extra bureaucracy that stifles innovation.

Connections and Maximizing Existing Capacity
The final consistent challenge raised by faculty relates to making and maintaining connections with the types of partners (units, programs and people connected with OSU or distinct from OSU) likely to improve success of proposals in general and broader impacts in particular. These partners can add value by tactically applying their existing programs, expertise and community connections to innovatively
create broader impacts associated with specific research. In many cases faculty may be aware that such partners exist, but do not have the time or resources to seek and sufficiently screen partners. Faculty may not have the expertise to identify which programs will best be able to generate broader impacts related to their research. Extension services and delivery units such as precollege programs seem to be the most visible. A few specific co-investigators are also sought out as partners for broader impacts intended to benefit underserved communities. But in general faculty do not have the tools to appropriately match programs to their needs. The partners also emphasized the difficulties of responding to PIs on short time scales after the project is nearly completely designed. The most successful broader impacts efforts are likely to be those which are integrated into the research (intellectual merit) and identify partners early enough in the proposal process to allow co-design of the project. Two other aspects of connection challenges include expertise needed to integrate both assessment and scholarship into broader impacts, and ability to consider (design and implement) international outcomes. Overcoming these challenge are likely to vastly improve the return on investment in broader impacts through realized benefits to society.

The convergence on both the opportunities and challenges surrounding broader impact efforts at OSU, despite the wide diversity and disciplines of participants, suggests the possibility for developing a path forward. In particular, if OSU is truly committed to being a leader in the area of broader impacts we have the opportunity to do so. That said, it is clear that these opportunities come with significant challenges, not the least of which is a deep seated culture that mitigates against faculty investing time and effort in activities outside of their research disciplines. Change in this culture will require building an appropriate and functional infrastructure, with administrative support at all levels, committed to the proposition that maximizing societal impact should be both a fundamental goal of the university’s research enterprise and as well an integral part of how the university evaluates the success of a modern academic.

Presentations and summaries created during the workshop are available online at http://stem.science.oregonstate.edu/BI.
Moving Forward

The afternoon was spent working in six small groups; each group focusing on a different area needed to move OSU forward in the area of broader impacts. The focus of the groups were: Developing a broader impacts vision statement for OSU; How to integrate scholarship into broader impacts; Issues of promotion and tenure; The role of outreach and engagement; and Tools needed to support improvements in OSU’s broader impact efforts. The sixth group, dubbed the Devil’s Advocates, addressed the question of why should we, or perhaps more accurately, shouldn’t we address broader impacts – their outcomes are distributed throughout this report many appearing in the challenges section above.

A Vision Statement

A working group of participants crafted a vision for OSU’s leadership approach to broader impacts, that vision is summarized in the following draft statement:

At OSU Broader Impacts represents a commitment to insuring a constant connection between the intellectual enterprise of the university and an enduring obligation to providing public value; a commitment to using the vast resources of the university to help build a healthier planet, healthier people and a healthier economy for Oregon and the nation. This commitment to Broader Impacts is reflective of the values and principles set forth in the OSU Research Agenda and integrated into every facet of university life from research (both fundamental and applied), to teaching, to community programs, and outreach and engagement. Accordingly, the University has functional and efficient processes that provide all faculty members with tools, incentives, and rewards to maximize the realized benefits to society of their work. OSU actively works to make its activities transparent and benefits accessible to the communities it serves. OSU has created an integrated “triple bottom line” structure to support the goals of healthy people, planet, and economy that actualize OSU’s strategic goal of solving society’s most intractable problems. This triple bottom line involves the integration of “intellectual merit”, “broader impacts” and financial sustainability.

Integrating Scholarship into Broader Impacts

One way to inspire good reviews of broader impacts is to integrate intellectual rigor, and when appropriate actual scholarship into all broader impact efforts. One workshop group convened to discuss this issue and recommended that interdisciplinary teams identify and include (from the beginning) a broader impacts broker to help frame the proposal and monitor delivery, evaluation, and reporting broader impacts once funding is received. Another important aspect of rigor is to ensure that societal needs are assessed and broader impacts seek to address the most pressing needs (based on evidence) relevant to the research. Such a focus on need is also likely to support the necessary cultural shift. It is suggested that the early adopters and innovators in broader impacts should be involved in designing a process to identify needs and broker broader impact activities. Any OSU-wide broader impact strategy should include investigations of a range of important questions surrounding the impact and efficacy of broader impacts and address methods for increasing efficacy.
**Promotion and Tenure**

Introduced in the challenges section above, incentives and rewards through evaluation and promotion and tenure processes was identified as a major hurdle for improving the quality and positive effects of broader impacts. It was suggested that just as NSF reviews proposals on both intellectual merit and broader impacts equally so should P&T processes recognize both aspects of professional contribution. Additionally non-tenure-track faculty should be evaluated and rewarded for their contribution to individual and aggregate broader impact success (this can most likely be done through position descriptions which generally guide evaluation processes). Participants argued that these changes in P&T and evaluation processes are necessary not just because of changes in NSF and other grantor guidelines but more importantly because they are reflective of the changing realities of university roles and responsibilities in the 21st century. The new emphasis of NSF and other funding sources should push OSU to tackle this issue now through small incremental changes, awareness, and grandfather processes that effect new faculty and new positions within the year, and a plan for more comprehensive change over the next 5 years.

**Outreach and Engagement**

OSU’s existing Outreach and Engagement faculty and staff are in a position to help researchers engage in relevant endeavors and generate necessary partnerships with communities in our region. Experience from past efforts suggests broader impact efforts need to be proactive, fluid, flexible and dynamic, and involve critical stakeholder communities. Although stakeholder groups will vary based on the research topic and the scope of the broader impact effort, it is essential to consider and address issues of diversity and inclusiveness such as gender, race/ethnicity, age, and social, cultural and economic status. It is also important to insure that all relationships be two-way, equally designed to serve the community as well as inform the research process. Approaching broader impacts in this way directly supports OSU’s mission as a Land Grant University and supports OSU’s strategic goals of improving the health of people, planet and economy. They are also consistent with several key provisions of the university’s Research Agenda.

**Tools for Support**

Many tools to ease development and implementation of broader impacts already exist on campus, currently lacking though are mechanisms and services which connect investigators to existing tools, people and projects. In addition to existing tools, several additional tools were identified as necessary for successful implementation of improved institution-wide success with broader impacts; including structures that would help to eliminate current barriers to efficiently conducting broader impact work. Development of these tools would allow investigators to link into aggregate/institution wide impact efforts, create opportunities for investigators to focus more energy on generating innovative ideas and likely to lead to the development of the kind of university-wide broader impact approach for which funders are currently advocating. Some suggestions for next steps are included in the Appendix.
**A Note on Timing**

Workshop facilitators frequently asked participants when should we tackle the challenges and changes that they recommended. The collective and consensus answer was *immediately* and *incrementally*. First we should leverage the successes and capacities we already have. Second we should identify small changes that are likely to make a significant difference with minimal cultural push back. Finally, we should look at instituting smart, effective and minimally intrusive structural and administrative changes that can support and sustain OSU efforts at becoming a national leader in creating meaningful and impactful broader impact efforts.

---

**Action Plan**

The December 7, 2012 “Broader Impacts Invitational Workshop” was rich with perspectives and ideas that can serve as a springboard to real change at OSU. There is a window of opportunity for OSU to significantly move its own commitment to improved societal impact forward, and in the process improve its competitiveness within the national funding landscape. Below is outlined a multifaceted set of recommendations/approaches for consideration by university administration. Some of these steps may need to occur in a specific sequence, while others can happen concurrently. We recommend that the Research Office maintain a central coordination function as OSU moves towards enhanced broader impacts outcomes.

A committee with two distinct, but cooperating parts, should be appointed to ensure increased momentum and follow-through on the actions recommended in this section.

1. One part of the committee should be comprised of the Research Development Officer and Administrative Leaders who serve on both the Research Council and the Council on Outreach and Engagement. These members can advise on issues of authority and administrative realities and opportunities.

2. A second part of the committee should be comprised of appointed “boots on the ground” faculty and staff engaged with broader impacts design, delivery and administration, who represent the interests of Colleges, Centers and Institutes, Academic and Student Affairs, and Outreach and Engagement. Their role will be to navigate the path for success in Broader Impacts as informed by the workshop and the recommendations below with an initial emphasis on identifying existing capacity and tools as well as new actions that are likely to demonstrate quick success and application.

This committee should be financially supported, potentially even remunerated for their time, but at a minimum provided a budget in order to pay for the services necessary for completing the specific tasks essential to the conduct of the committee’s charge.
**Defining Broader Impacts for OSU**

OSU should adopt a consistent and comprehensive vision for broader impacts, one that encompasses both the aspirations of OSU as a Land Grant University and realities of being a university with commitment to making the world a better place in which to live. The following serves as an initial draft of such a vision:

At OSU Broader Impacts represents a commitment to insuring a constant connection between the intellectual enterprise of the university and an enduring obligation to providing public value; a commitment to using the vast resources of the university to help build a healthier planet, healthier people and a healthier economy for Oregon and the nation. This commitment to Broader Impacts is reflective of the values and principles set forth in the OSU Research Agenda and integrated into every facet of university life from research (both fundamental and applied), to teaching, to community programs, and outreach and engagement. Accordingly, the University has functional and efficient processes that provide all faculty with tools, incentives, and rewards to maximize the realized benefits to society of their work. OSU actively works to make its activities transparent and benefits accessible to the communities it serves. OSU has created an integrated “triple bottom line” structure to support the goals of healthy people, planet, and economy that actualize OSU’s strategic goal of solving society’s most intractable problems. This triple bottom line involves the integration of “intellectual merit”, “broader impacts” and financial sustainability.

**Conduct a “SWOT” Analysis**

Building on the initial, somewhat ad hoc identification of current broader impact efforts at OSU, a more comprehensive analysis of current broader impact activities needs to be conducted to document strengths, weaknesses, opportunities and threats, building from the information gathered during the workshop. Ideally, this analysis would include several critical case studies which could serve to highlight when the present system has worked well as well as when it has failed, and thus provide a useful departure point for future improvements.

**Institutionalizing a Commitment to Broader Impacts at OSU**

Develop a blueprint for creating a more effective, campus-wide infrastructure for designing and implementing broader impacts. In recent history OSU has added new capacity to coordinate technology transfer and business development. Comparable coordinating infrastructure(s) will be necessary if OSU is to achieve the comprehensive vision for broader impacts described above. Implementing a new vision for broader impacts will require maximizing the benefits of existing broader impacts related capacity and the development of new capacities. This collaborative effort may include the new Research Development Director, the Office of Commercialization and Development, Center for Research on Lifelong STEM Learning, Outreach and Engagement, Precollege Programs, University Relations and Marketing, and other units strong in design and delivery of broader impacts.

Developing a blueprint for significantly advancing broader impacts at OSU will require, at a minimum, strategies for answering the following key questions:
Communication and Collaboration

- What communication strategies are required to bind together the diverse and disparate parts of the OSU research enterprise?
- How best to facilitate collaboration across units (both academic and professional) to increase the efficiency and/or value of broader impacts?
- How best to facilitate collaboration with other educational, research and outreach institutions and organizations?
- How best to facilitate learning from stakeholders and insuring two-way support and communication between communities and researchers?
- How will the impacts of broader impact efforts on campus be supported and promoted through communications and marketing?

Capacity and Resources

- What existing capacity exists (for a variety of scales, locales and diversity of beneficiaries) and how could it best be structured to support future efforts?
- What new capacities are required (to reach all scales, locales, and a diversity of audiences) and how will these capacities be generated?
- How best to strategically leverage existing resources and indirect funds to maximize efficiency and impact?
- What resources might be found to foster advances in broader impacts at OSU and support innovation and improvement?
- What benefits and costs would be associated with a Broader Impacts matching fund and other proposed resource solutions?

Institutional Structure and Change

- How would broader impact goals for the university be defined and prioritized?
- How would target audiences be defined and prioritized?
- How to insure intellectual rigor in broader impact efforts, in particular how to build scholarship of broader impact efforts into efforts from the beginning?
- How to insure that broader impact efforts are appropriately and systematically evaluated – what expertise is required and how will resources necessary for assessment to be assured?
- What strategies will be put in place to monitor, and as necessary “enforce” movement towards a holistic, university-wide system?
- What structures will be put in place to support faculty in this endeavor?
- What administrative and cultural structures will be put in place to move OSU towards acknowledgement of the value of broader impacts during the hiring and P&T processes?
- What steps will be taken to support publication and scholarship related to broader impact efforts?
- What effect would a focus on culture shift among early career faculty have in both the short and long-term?
Develop an Implementation Strategy: Both short and long-term to spark a culture shift

Beyond laying out a blueprint for what structures and capacities need to be in place, the committee will need to identify the actionable steps for implementing change. As suggested by participants at the December 7 Workshop, there are likely numerous small steps that could be quickly implemented and could result in immediate and incremental change, including elimination of administrative bureaucratic and cultural hurdles. In addition, it will be necessary for the committee to articulate a larger, longer term plan; such a plan will by necessity involve significant shifts in the university culture and will require involvement of both administration and the faculty senate. It may include strategies to address the cultural and structural barriers to overcoming complexities associated with collaboration and integration across units and along the spectrum of subcultures between fundamental research and outreach and engagement.
Appendix I: Workshop Materials

OSU Broader Impacts Invitational
Pre-Workshop Materials

Thank you in advance for spending your time towards improving the broader impacts achieved by OSU through research, teaching and training, programs, and outreach and engagement.

This document contains brief explanations to help prepare you for full participation on Friday December 7, 2012 from 8:15 a.m. to 4:30 p.m. at the CH2M Hill Alumni Center in the Willamette Room.

Contents

- Parking Information
- Broader Impacts at OSU including Broader Impacts Definition
- New (November 2012) NSF Broader Impact Guidelines
- Broader Impacts Perspectives and Excerpts
- Workshop Agenda

If you have any questions prior to the workshop please contact us.

Center for Research on Lifelong STEM Learning

Julie Risien, Assistant Director
Julie.Risien@oregonstate.edu
(541)737-8664

John H. Falk, Director
falkj@science.oregonstate.edu
(541) 737-1826

Division of Outreach and Engagement

Peg Herring, Ext. and Experiment Station Communications
Peg.Herring@oregonstate.edu
(541)737-9180

Scott Reed, Vice Provost
Scott.Reed@oregonstate.edu
(541)737-2713

PARKING INFORMATION:

Parking is in the Reser Stadium Parking lot just across from the Alumni Center. Faculty/staff and student permits are required in this lot. If you have a permit be sure that you do not part in metered, handicapped, or service spaces. If you do not have a permit you can park in this lot for $7.00 using the Pay and Display machines which take exact change or credit cards. Neither the Center for Research on Lifelong STEM Learning nor the Division of Outreach and Engagement can reimburse parking expenses.
Broader Impacts at OSU

This workshop is part of a long-term campus wide initiative with the following goals:

1. Ensure that OSU is more effective in all of its “broader impact” activities, including communicating and disseminating the impact of research to various sectors, broadening the participation of under-represented groups, creating innovative new business opportunities, and creating and supporting future researchers or other methods for advancing the nation and region’s health, well-being and security.

2. Ensure that the whole of OSU broader impact efforts are functionally and conceptually greater than the sum of the parts by building synergies within and across individual program areas and maximizing the potential of the collective intellectual and financial resources devoted to these efforts on campus.

3. Make OSU more competitive by virtue of the quality of its individual and collective broader impact efforts.

Statement of Problems

At present OSU engages in myriad efforts to engage the public as part of its commitment to broader impacts; particularly in response to the requirements imposed by funders such as the National Science Foundation. Currently there is no OSU-wide understanding of the nature and scope of these myriad efforts; of which some are undoubtedly well conceived and excellently implemented while others are at best perfunctory and designed to meet the minimum standards of acceptability. In the absence of shared information on these efforts creating synergies between projects or learning of past successes or failures is almost impossible.

There is a widespread assumption that many, if not most OSU STEM PIs feel academically ill-prepared to develop or implement strong broader impact plans but hard evidence for the veracity of this assumption are currently lacking. What is known is that across the campus there are individuals with expertise related to public engagement and education – these individuals include Extension faculty, learning researchers, particularly informal/free-choice learning faculty, social science and policy faculty and a range of other faculty, but again these individuals are generally not regularly consulted as proposals are developed. At a minimum, input from these knowledgeable faculty and staff could provide much needed guidance on the overall guiding strategy and a coherent theory of action.

As a consequence of the above it is asserted that currently, many if not most of OSU’s broader impact efforts are: a) conceptualized and implemented on an ad hoc basis, independent of comparable efforts being conducted elsewhere on campus; b) highly personalized, impacting few over short time periods, c) lacking in clearly defined objectives, prioritized audiences, research-tested pedagogical approaches and appropriate plans for evaluating impacts and outcomes; and perhaps most glaringly, d) typically are conceived and executed without the same care and intellectual rigor as is the STEM research they are designed to support (in NSF terms, “Intellectual Merit”).

Towards a Solution

The Center for Research in Lifelong STEM Learning in collaboration with the University Division of Outreach and Engagement has convened the one-day invitational workshop. You will be participating alongside key OSU STEM researchers, learning scientists, public policy experts and outreach,
engagement and science communication practitioners drawn from every College and Research Center on
campus as well as administrative units. The meeting will focus on two key outcomes:

1. Moving OSU towards the creation of a strategic approach to broader impacts in order to
   measurably improve the competitiveness of all OSU initiated proposals; and
2. Identifying the specific tools investigators and units need to effectively design and successfully
deliver and assess quality broader impacts efforts.

Funders such as the National Science Foundation are placing ever-greater emphasis on the need for
broader impact efforts that, in the aggregate are meaningful and impactful. Ideally, this workshop will set
OSU on a trajectory to designing and implementing a campus-wide approach to broader impacts that can
serve as a national model, and in the process enhance the capacities and competitiveness of individual
investigators and the university as a whole.

Broader Impacts Defined
During this workshop we use the term “broader impacts” widely to include: promoting teaching, training
and learning (for all ages and in all settings); broadening the participation of underrepresented groups
(e.g., gender, ethnicity, disability, geographic, etc.); enhancing the infrastructure for research and
education, such as facilities, instrumentation, networks and partnerships; broad and effective
dissemination of discoveries to enhance scientific and technological understanding; and any activities
attached to research that extend the benefit to society or engages society in the process.

New NSF Broader Impact Guidelines (November 2012)

1. Merit Review Principles
These principles are to be given due diligence by PIs and organizations when preparing proposals and
managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff
when determining whether or not to recommend proposals for funding and while overseeing awards.
Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic
research and education, the following three principles apply:

• All NSF projects should be of the highest quality and have the potential to advance, if not
  transform, the frontiers of knowledge.

• NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These
  broader impacts may be accomplished through the research itself, through activities that are
directly related to specific research projects, or through activities that are supported by, but are
complementary to, the project. The project activities may be based on previously established
and/or innovative methods and approaches, but in either case must be well justified.

• Meaningful assessment and evaluation of NSF funded projects should be based on appropriate
metrics, keeping in mind the likely correlation between the effect of broader impacts and the
resources provided to implement projects. If the size of the activity is limited, evaluation of that
activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these
activities may best be done at a higher, more aggregated, level than the individual project.
With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.(i) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit**: The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts**: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
   a. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. benefit society or advance desired societal outcomes (Broader Impacts).
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?
Broader Impacts Perspectives

It is clear that the ability of individuals and institutions as a whole to demonstrate a positive impact on society has become more integral to receiving funding for research. It is also clear that the conceptual design, implementation and approach to measure the quality and extent of our impacts are being assessed with greater scrutiny. Below are some excerpts of opinion pieces by academics with regard to broader impacts and information about the America COMPETES Act.


Being on this committee [the NSF Committee on Equal Opportunity in Science and Engineering, or CEOSE] has heightened my awareness of the Broader Impacts criterion for review of NSF Proposals. There are only two merit criteria for review of proposals, with the second being Intellectual Merit. Most of us understand Intellectual Merit, but Broader Impacts is not so easily understood.

In the eyes of NSF these two criteria are equally weighted. Indeed, if one totally ignores the Broader Impacts by not mentioning it in a proposal, then it will be returned without review. One way to think about the Broader Impacts criterion is that when we receive money from the people of the United States through NSF, the people would like to know ahead of time of what benefit the research may or will be to society. If there is little or no benefit then why should the people continue to support NSF? When NSF goes to Congress to ask for money, it is going to the people’s representatives, who ask for justification to spend the people’s money on scientific research. Basically, NSF’s funding, and ours indirectly, depend on the belief by the public that broader impacts come from our research.

Some people have said to me that a focus on Broader Impacts is a move away from basic research to more mission oriented research, or research with strings attached. If we look at the ways that we can satisfy the Broader Impacts criterion, they are very general, and relate to education, broadening participation by underrepresented groups, and other benefits to society.

The best way to increase funding for research is to convince people it is important to them and the people around them. There is a difference between important and useful. Artists are able to convince people to buy art, not because it is useful, but because it inspires them. Astronomers convince people to pay them to study the stars, not because they are useful (except for our own star, the sun), but because the stars are fascinating in their own right. Understanding the birth and possible death of the universe is of no practical value, but is just a fundamental question.

All this said, I am a firm believer in serendipity. Often, research leads to unexpected results and unanticipated applications. Unfortunately, this phenomenon is quite rare and probably not common enough to convince people to provide large amounts of research money. The best approach is to have a great story about the benefits of theoretical computer science research and its promise for the future. This will generate enough money for all of us so that rare serendipitous events will happen naturally in the course of doing our research.
One way to have broader impact is to include more women, minorities, and persons with disabilities in our research projects. Another way is to do outreach to K-12 schools or museums. Widening the vision of our research programs beyond their small technical boundaries takes some effort and creativity. The reward is more appreciation for our work from a wider audience. This appreciation indirectly translates to funding by enabling NSF to successfully argue for money from the people for research.

Excerpts from *Computing Research News Broader Impacts Criterion* by Andrew Bernat and others from the Computing Research Association. September 2010

The NSF Broader Impacts for Research and Discovery Summit (BIRDS), held in June 2010, brought together NSF CISE - Computer Information Science and Engineering research community to discuss, present, and subsequently develop guidance materials for the NSF CISE research community on how to effectively integrate activities that address the NSF broader impacts review criteria into their research proposals and subsequent research.

At the workshop, it was noted that, beyond the prodding of Congress, there are many reasons to care about BI and to connect science to society in order to:

- Ensure better public understanding of science and engineering.
- Ensure better public appreciation of research, its purpose and impact.
- Inspire the young to enter science and engineering.

It was also noted that researchers supported by NSF have a long-standing, implicit compact with taxpayers to use public funds to pursue avenues that will, in the aggregate, ultimately benefit society. Broader Impact seeks to ensure that this commitment is met.

Participants discussed examples of broader impact activities such as:

- Develop educational materials for elementary, high-school and undergraduate students.
- Involve high-school and undergraduate students in research where appropriate.
- Create or participate in existing effective mentoring programs.
- Develop, maintain and operate a shared research infrastructure.
- Establish international, industrial or government collaborations.
- Form start-up companies.
- Present research results to non-scientific audiences from policy-makers to average citizens.
- Give presentations about the field to the public to foster life-long learning.
- Develop exhibits in partnership with museums.

These examples include not only the “traditional” activities, but also those focused on improving the infrastructure for research with multiplicative affects. As is clear from these examples, broader impact activities are typically more focused on direct impact than the “innovation” that is a hallmark of intellectual merit. Indeed, it is often preferable to leverage current validated efforts than to attempt new ones for the sake of BI innovation.

There are many issues that still need to be addressed. For example:
• Does the measure of broader impact depend on the level of effort involved, on the impact, or on some other measure?
• How should reviewers evaluate broader impacts statements?
• How much should broader impacts “count” compared to intellectual merit?
• How should NSF monitor progress of broader impacts statements?
• How should PIs be held accountable for their current and past statements?
• How does one measure the success of a broader impacts activity?
• What is the cost of broader impacts and where should funding come from? Line item in budget? Separate program?

The House version of America COMPETES has potential implications for research departments and their institutions as well, as it “requires principal investigators applying for Foundation research grants to provide evidence of institutional support for the portion of the investigator’s proposal designed to satisfy the Broader Impacts Review Criterion, including evidence of relevant training, programs, and other institutional resources available to the investigator from either their home institution or organization or another institution or organization with relevant expertise.” This suggests that departments, universities, and professional organizations could look more closely at existing or future activities that can be strengthened by faculty involvement and which translate to broader impact activities.

The America COMPETES Act

The America COMPETES Act was signed by President Obama in January 2011. It represents a major milestone on this Nation’s path to building an innovation economy for the 21st century—an economy that harnesses the scientific and technological ingenuity that has long been at the core of America’s prosperity and applies that creative force to some of the biggest challenges we face today. Whether it’s developing new products that will be manufactured in America, or getting and using energy more sustainably, or improving health care with better therapies and better use of information technology, or providing better protection for our troops abroad and our citizens at home, innovation will be key to our success. And that is exactly what the COMPETES Act is all about.

COMPETES keeps America on a path of leadership in an ever more competitive world. It authorizes the continued growth of the budgets of three key agencies that are incubating and generating the breakthroughs of tomorrow—the Department of Energy’s Office of Science, the laboratories of the National Institute of Standards and Technology, and the National Science Foundation. COMPETES also bolsters this Administration’s already groundbreaking activities to enhance STEM education—to raise American students from the middle to the top of the pack and to make sure we are training the next generation of innovative thinkers and doers. More information on COMPETES at http://www.whitehouse.gov/blog/2011/01/06/america-competes-act-keeps-americas-leadership-target
OSU Broader Impacts Invitational Workshop Agenda

Friday December 7, 2012
CH2M Hill Alumni Center
Willamette Room

8:15 a.m. Registration and Light Breakfast (coffee, tea, fruit and pastries)
8:30 a.m. Welcome - Rick Spinrad
8:40 a.m. Defining Broader Impacts and Framing the Opportunity – John Falk
8:55 a.m. Identifying Where and How our Impact is Needed – Scott Reed
9:10 a.m. Morning Break-Out Groups
Focus on opportunities and challenges facing PIs, units, colleges, and OSU with regards to broader impacts
10:05 a.m. Break (coffee, tea)
10:25 a.m. Reconvene in the Willamette Room (Facilitators give 1 minute reports)
10:45 a.m. Facilitated Full Group Discussion
Reflections on morning reports and thinking about broader impacts at the systemic level
12:00 p.m. Lunch (Buffett)
12:50 p.m. Reconvene in the Willamette Room (receive room assignments/instructions)
1:00 p.m. Afternoon Breakout Groups
Focus on development of necessary tools to enhance broader impacts proposals and outcomes with an eye to new NSF emphasis on “aggregate” solutions
2:00 p.m. Break (cheese, granola bars, fruit, juices and water)
2:15 p.m. Reports on Afternoon Breakouts (Facilitators give 5 minute reports)
3:15 p.m. Facilitated Full Group Discussion
Focus on moving forward with a strategy
4:00 p.m. Wrap up and Next Steps
4:30 p.m. Adjourn
Appendix II: Workshop Participant List

Participants
Sam Angima, Extension
Mike Bailey, Engineering
Randy Bell, Education
Luiz Bermudez, Veterinary Medicine
Jana Bouwma-Gearhart, Education
Linda Bruslind, Science
Javier Calvo-Amodio, Engineering/Honors Col.
Jeff Chang, Ag Sciences
Lorenzo Ciannelli, CEOAS
Kathryn Ciechanowski, Education
Kyle Cole, Precollege Programs
Joe Cone, Oregon Sea Grant
Flaxen Conway, CEOAS/Oregon Sea Grant
Lynn Dierking, Education
Tevian Dray, Science & Honors College
Liz Etherington, Ag. Sciences
John Falk, Ctr Res. on Lifelong STEM Learning
Larry Flick, Education
John Fowler, Ag Sciences
Lisa Gaines, Institute for Natural Resources
Michael Giamellaro, Education/Cascades
John Greydanus, Information Services
Dave Hansen, Oregon Sea Grant
Rich Holdren, Research Office
Fred Kamke, Forestry
Christine Kelly, Engineering
Doug Keszler, Science
Dave King, E Campus
Sharon Krueger, Linus Pauling Institute
Denise Lach, Liberal Arts
Jim Lerczak, CEOAS
Bettye Maddux, Science
Deborah Maddy, Outreach and Engagement
Ray Malewitz, Liberal Arts
Corinne Manogue, Science
David McIntyre, Science
Richard Nafshun, Science
Matt Nyman, Education
Rick Orozco, Education
Kevin Patton, Liberal Arts
Lisa Price, Liberal Arts
John Punches, Extension
Sujaya Rao, Ag Sciences
Participants (continued)
Marilyn Read, Business
Scott Reed, Outreach and Engagement
Roger Rennekamp, PHHS/Extension
Charlotte Ross, International Programs
Shawn Rowe, Education/Oregon Sea Grant
Chris Sanchez, Liberal Arts
David Shaw, Forestry
Mehra Shirazi, Liberal Arts
Brian Sidlauskas, Ag Sciences
Eric Skyllingstad, CEOAS
Rick Spinrad, Vice President for Research
Steve Strauss, Forestry
Mark Van Patten, Business
Eric Weber, Education
Eugene Zhang, Engineering

Facilitators
Jane Barth, Contracted Facilitator
Peg Herring, EESC
Jeff Hino, EESC
Dio Morales, EESC
Anna Pakenham, CEOAS
Julie Risien, Ctr Res. on Lifelong STEM Learning
Tiffany Woods, EESC

Student Volunteers
Dave Cade, Biological Oceanography
Jennifer Collins, Science Education
Krissi Hewitt, Science Education
Jessica Reimer, Zoology
Wolfe Teresa, Science Education
Cathleen Vestfals, Biological Oceanography
Katie Woollven, Marine Resource Management
Appendix III: Initial “Sweep” of Broader Impacts Capacity at OSU

OSU Strategic Plan and Research Agenda
The OSU Strategic Plan has three “Signature Areas of Distinction”: Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress. All three of these areas and their associated goals are bolstered by greater success in delivering broader impacts with our research. The full strategic plan can be found at http://oregonstate.edu/leadership/strategicplan.

The OSU Research Agenda identifies values for our research community: Relevance, Integration, Collaboration, Leadership and Accessibility. Innovation and improvement in the broader impacts arena embodies these values. The full research agenda can be found at http://oregonstate.edu/research/research-agenda.

Finally emphasis on broader impacts is not only likely to include our competitiveness, but it naturally supports our land grant mission.

As a land grant institution committed to teaching, research, and outreach and engagement, Oregon State University promotes economic, social, cultural and environmental progress for the people of Oregon, the nation and the world. This mission is achieved by producing graduates competitive in the global economy, supporting a continuous search for new knowledge and solutions, and maintaining a rigorous focus on academic excellence...”

OSU Communications, EESC, and college or institute based communications programs
An example of interdisciplinary grant collaborations already in place at OSU is the work of the Department of Extension and Experiment Station Communications (EESC). EESC communications faculty work with OSU’s Extension and research faculty to develop effective learning experiences for the public.

Using a wide range of narrative and visual media, EESC faculty produce publications, news articles, animations, and videography that help the public understand critical issues in science, technology, health, and economics. These learning materials are developed collaboratively with researchers and made fully accessible to the public through the OSU Extension Catalog and OSU’s ScholarsArchive, where our peer-reviewed materials are archived in perpetuity and periodically reviewed for continuing accuracy.

EESC’s team of science communicators and instructional designers help research faculty reach a broader audience through mobile access designs, mass media and online social networks, and interactive learning, often in multiple languages. EESC collaborates with researchers in the early stages of grant proposal development to ensure that an effective plan is in place for engaging the public in the broader impacts of research. An overview of our grant collaborations is at http://extension.oregonstate.edu/eesc/grant-collaboration

There are many other communications units on campus create publically accessible materials to extend the impact of research. These include Oregon Sea Grant, Forestry Communications Group, College of
Earth, Ocean, and Atmospheric Sciences, University News and Research Communications, and others. Many of these units have the capacity to help determine audiences and begin to narrow messages as early as proposal development.

Youth Programs
OSU has a long history of delivering youth enrichment programs serving over 100,000 youth annually through 70 different youth programs ranging from summer internships in science and engineering to athletic day camps. Programs are sponsored by colleges, centers and institutes, and extension services and have reported over a million contact hours with youth and the K-12 education community.

Faculty have established new youth programs as part of their grant-funded broader impact work or tap into the range of existing OSU youth programs – a vast resource to broaden faculty research impacts. Faculty can participate in programs to develop K-12 curriculum, work with high school teachers or interact directly with K-12 students. Faculty can involve their undergraduate and graduate students in meaningful outreach that satisfies grant requirements and provides leadership opportunities for their students.

Connecting faculty and staff with youth program opportunities is a goal of the office of Precollege Programs which supports youth program community by serving as a centralized point of contact and offering professional development and youth safety trainings. The office of Precollege Programs enables faculty to broaden their education impacts by: matching programs to fit faculty needs; providing program infrastructure (administration, marketing, registration, etc.) allowing faculty to focus on delivering content and connecting with students; and consulting with faculty to initiate new outreach programs, advising on outreach best practices and connecting faculty with local K-12 resources.

To see a portfolio of youth program opportunities, see: “Broader Impacts for the K-20 Community”: [http://oregonstate.edu/precollege/sites/default/files/precollege_programs_broader_impacts_for_faculty%20Catalog.docx](http://oregonstate.edu/precollege/sites/default/files/precollege_programs_broader_impacts_for_faculty%20Catalog.docx)

Youth engagement occurs through a variety of additional efforts including collaboration between faculty and K-12 teachers, teacher trainings, extension faculty in schools, and student and family experiences at off campus facilities such as the Hinsdale Wave Laboratory, the Hatfield Marine Science Center, and OSU’s forestry, agricultural sciences and veterinary medicine facilities.
Outreach & Engagement
The Division of University Outreach and Engagement connects OSU to the rest of the world by making its research and educational programs accessible wherever and whenever people need to learn. It is both an administrative unit and a mission of OSU, the state’s only land-grant university.

The division includes: Ecampus, which provides learners with worldwide access to a high-quality OSU education via online degree programs; and the OSU Extension Service, which provides practical education to help people solve problems, develop skills and improve their lives.

The goals of outreach and engagement at OSU include many that are important to creating broader impacts. Access reaches people when and where they choose to learn. Partnerships bring the strength of a community to develop education and public understanding. Scholarship, integration, and culture are important to making broader impacts a recognized, rewarded, and important part of the institutional expectations at OSU. And resources, of course, are necessary to build this new culture and capacity for broader impacts.

To learn more about the goals of outreach and engagement at OSU, see http://outreach.oregonstate.edu/about/strategic-plan

Innovation, Commercialization, and Business Partnerships to boost jobs
The Office for Commercialization and Corporate Development (OCCD) can support broader impacts with regards to business development and commercialization of University intellectual property. From Oregon-based startups to large international companies, the OCCD facilitates OSU research to impact the world. The Venture Accelerator (new in 2013) is designed to identify ideas or research findings that might form the basis for profitable companies, then streamline their development by providing the legal, marketing, financial and mentoring expertise needed to turn good ideas into real-world businesses. It draws on the resources of the Office of Commercialization and Corporate Development and the College of Business, and the goals are clear: help create new businesses, drive economic growth and expand education and job opportunities for students, graduates and other Oregonians.

Centers and Research Institutes
Several of the more than 30 OSU Centers and Research Institutes (http://oregonstate.edu/research/cci) have internal capacity to broker and manage large scale proposals inclusive of developing innovative broader impacts associated with transdisciplinary research. These units are valuable partners as many have in house outreach and/or communications professionals. In addition, Centers often are linked with state and national scale bodies and other organizations outside of the academy and can assist in developing partnerships valuable for realization of broader impacts.

Research and Professional Faculty
While this document focuses on the need for enhancing our broader impacts capacity there are numerous examples of OSU faculty who are early adopters of integrating broader impacts into research and they shine when it comes to designing and delivering a tangible benefit. Despite the current lack of institutional infrastructure to support their endeavors, these innovators find the right partners, focus on
appropriate outcomes, and produce measureable impacts. This report recommends critical case studies as part of a SWOT analysis to capture the strategies that lead to success for some of our most exemplar faculty so that we may learn from their efforts.

**Other**

Additional capacity for broader impacts lies with our partners including state and federal agencies, tribal governments, city and county governments, schools, industry and small businesses, non-profit organizations, other universities and our own vast off campus facilities.
Appendix IV: Participant Comments on Report Draft

Participants, and nominating deans and administrative heads were invited to review and comment on a draft version of this report between March 19, 2013 and April 3, 2013. Most of the comments are reflected in this final draft of the report. They are included here for reference.

The draft document looks really good to me. I don’t have any comments other than that it is encouraging to see this and I think this is a great direction to move OSU. Thanks for your work on this.

I think this is a good report and it does a fine job of identifying the opportunities and challenges. I think it also correctly recognizes that there is an opportunity for OSU to help with broader impacts at an institutional level, as was recommended by the NSB.

My concern is that our aspirations might exceed our capabilities, especially given our limited resources. I think we need to set some priorities as clearly there is more to do than we can do with our limited time and money resources. One approach might be to focus on the early career faculty. First, they have the most interest in broader impacts and seeing that their science can make a difference. Second, they have the least experience or opportunity. Many simply don’t know where to begin. Third, they are the most driven by the existing P&T culture that puts a higher premium on traditional scholarship. Fourth, their grants tends to be smaller so they have fewer resources.

Put together, a focus on early career faculty might stand the greatest chance of success while at the same time having the greatest impact by being accomplished through an institutional approach (rather than by individuals). I think OSU could really show itself as thinking differently by focusing on early career faculty.

Thanks for the opportunity to provide feedback. What an effort!

1. The draft is very good and captures the essence of the meeting.

2. In my view, what is a problem at OSU life sciences program is the lack of integration. You cannot find "broad impact" without dealing with complex issues. And to address that, one needs to integrate disciplines, programs, etc. Although OSU prides itself on collaborative work, the majority is not broad enough, and there is an intrinsic resistance to maintain Departments and College structures, which are now out of line with vanguard science.

So, more emphasis on integration and change of culture would be a welcome aspect of the report. I see a lot of "words" but I do not see change on the ground.
What I found missing at the meeting as well as in the report is that broader impacts does not imply that scientists become active in the community. There is a relationship between basic research, strategic research and applied/application of the research. Some definitions are below http://www.quantum3.co.za/CI%20Glossary.htm

Basic research is work of a general nature, conducted in order to acquire Knowledge of the underlying foundations of phenomena and observable facts without any obvious practical application in view. The results are usually published in the appropriate literature. It is sometimes referred to as Fundamental research. Strategic research is mission-oriented and involves the application of established scientific Knowledge and methods to broad social or economic objectives, often extending over a considerable period.

It is, I believe, quite difficult to go directly from most basic science research to direct interaction with people in its application. I felt that somehow a step was missing and that the meeting did not contain enough individuals (and leadership) who had worked at this bridge.

I worked in the CGIAR system as a Senior Scientist for a number of years engaging strategic research with my colleagues in the agricultural sciences and this is the foundation of what I present above. This approach allows for the kind of "big science" we do at OSU. I do not think we will be successful if both science and society are well married.

I attach a simple slide on strategic research as well. I hope this helps. But in any case you have my thoughts.

I think the report reads well and walks a good line between what is necessary in order for OSU to be competitive in terms of funding and what is complementary to the broader mission of the university. I think it can be a slippery slope (in terms of commitment and quality of work) if people identify broader impacts only as a means to an end: money. While being competitive for grant funding is essential,
broader impact also presents exciting opportunities in terms of a cultural shift in how people carry out their research and extension, affect communities, and are rewarded. I thought you hit all the key elements in the draft vision on page 9.

Nice job on this.

The report is very well written and I think it nicely weaves broader impacts into the mission of the University. If the recommendations are followed, the paradigm shift could engage and energize a wide range of faculty and staff. Thanks for putting it together!

Broader Impacts matching funds should be noted as a topic of interest in the report, along with a recommendation that a workgroup be formed to investigate a potential process for BI matching funds. This could be a valuable tool for faculty.