REPORT

Landscape Overview of University Systems and People Supporting Scientists in their Public Engagement Efforts

Summary of Existing Recommendations and Evidence from the Field

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**Landscape Overview of
University Systems and People**

Scientists (and engineers) wishing to conduct public engagement do so in the context of established disciplinary norms and complex institutional systems that may support or limit their success. This report seeks to convey the known complexity, unique challenges, and opportunities for universities to better support for scientists in their public engagement work. The report is intended to drive discussion towards deeper exploration and development of actionable next steps.

Overview

Universities are undergoing transformation. Much energy has been directed toward system wide understanding of the challenges and triumphs around improving undergraduate success. Here we focus on understanding the status, and potential levers of change, for universities to better enable scientists to successfully engage with the public. Considerable anecdotal knowledge and discourse reliably point to persistent challenges including 1) lack of resources and capacity to conduct successful engagement, 2) mismatched reward structures, and 3) unsupportive academic culture. This report includes:

- Part I: a brief summary of prominent existing recommendations
- Part II: insights gained from people across levels and universities through a series of focu groups and interviews
- Part III: a summary of possible levers of change to explore for action
- Part IV: additional questions in need of consideration

A curated set of recent documents used to develop this report, and reflective of current issues facing universities, appears at the end.

PART I: Summary of Existing Recommendations

How universities support scientists to communicate and engage is increasingly a topic in workshops, conferences, reports, and opinion pieces. This section summarizes key topics and recommendations that are commonly discussed and shared. See the "Recent Resources" section at the end of this report for a list of referenced material.

Science communication training and professional development
Universities provide various opportunities for scientists, graduate students, and postdocs to receive science communication training. However, year-to-year these trainings can be inconsistent; scientists and students cannot depend on their availability. Science communication practice is constantly developing as well; consistent trainings could help scientists to adapt to new communication technologies and practices to more effectively share their work and connect with a variety of groups. Trainings should also encourage scientists to share their scientific knowledge in ways that show, not assert, the merits of science to a potentially skeptical public. There is broad acknowledgement that scientists need improved skills to communicate with the public. Improved communication skills may also aid engagement collaborations with communication professionals, scientists from other disciplines, or community partners.

Organizational structure
Universities need structural reorganizations that solidify public engagement as a key part of each institutions' organizational mission. Dedicated organizations or university offices could define and make

accessible core competencies and communication skills necessary for effective engagement. New institutions, such as Communication Science Central, and promising organizational forms such as networks and communities of practice, may facilitate universities' capacity to promote and enhance the public engagement efforts of scientists.

Promotion and tenure

Proponents of increasing the quantity and quality of public engagement consistently come up against the challenges related to limited recognition for this work in promotion and tenure decisions. Recommendations to incorporate engagement into promotion and tenure decisions are not novel, but remain complicated by different understandings of what qualifies as the duties and responsibilities of scientists. Many scientists report that the cultural norms of the scientific community continue to downplay the importance of public engagement activities and frame these activities as unrelated to core research activities. A variety of recommendations to change cultural norms already exist, such as championing researchers who carryout successful engagement activities. Consistent recommendations to make promotion and tenure more accepting of public engagement highlight a deeper need to clarify the potential positive societal impact of increased engagement. Proponents assert that engagement foster two-way communication between the public and scientists with potential to improve research design and outcomes in the future, but there is little evidence that such a benefits are realized broadly.

The role of science in public policy

Also of growing concern are differences of opinions regarding connections between science and policy. Some individuals maintain a more traditional mindset, feeling that the role of the scientist is to provide objective scientific evidence but avoid commenting on what implications that information may have for policy. Others see the need for scientists to make their research findings more applicable to policy discussions and indeed even shape research questions to address questions of political importance. The conflict between these schools of thought is reflected in mixed recommendations about how public engagement should be designed and implemented.

PART II A: OVERALL IMPRESSIONS ACROSS UNIVERSITIES

The insights below come from a top level analysis of a series of seven video conference focus groups across levels of the university hierarchy. Each group included three to five individuals across 22 institutions. The conversations were oriented to gather key insights about the lived experiences of scientists conducting engagement and others in supporting scientists' engagement efforts. We provided a series of conversational prompts to stimulate discourse about 1) engagement supports and resources across levels at their institutions; 2) social and cultural aspects of engagement; 3) the roles of disciplinary societies and other external entities; 4) mentorship and training; and 5) university reward structures.

Institutional issues
- There is abundant hope for the future generation of scientists and accordingly an increasing number of opportunities for graduate students and postdocs to receive engagement training. However, counteracting forces are at work. Young scientists who wish to pursue engagement as a meaningful part of their professional lives may be less likely to persist in academia, leaving few models of change rising through university ranks and slowing the pace of systemic change.
- Promotion and tenure reform is the trumpeting elephant in the room, but resistance remains pervasive. Some critical challenges relate to how engagement, as coupled with "service", dilutes motivation and opportunity for recognition and reward. Engagement is therefore rarely considered in terms of tradeoffs, but generally done in addition to full teaching and research workloads.

- There have been successes in updating reward structures to explicitly include engagement and even engaged scholarship. Updated reward structures must maintain flexibility to account for differences in institutions, disciplines, and the variety of possible paths for engagement. Just as "teaching" could convey many 600 student lectures *or* just one graduate seminar, "engagement" can take many forms.
- Engagement does not lend itself to parsimonious metrics and indicators of success. Because engagement is not a direct revenue generator, common metrics are unlikely to compel investments in infrastructure. It may be more useful to consider metrics as a means of accountability and focus on stories of value as indicators of impact.

Professional issues
- Agency and self-efficacy to engage in systemic change seems lacking. Participants had relatively constricted views on which parts of the system they could influence indicating the challenges of vertical integration at large institutions.
- Participants expressed concern that the amount of time to develop the necessary partnerships and collaborations for public engagement is undervalued across levels at universities and by funders.
- Scientists successful with engagement shared a common experience of bootstrapping. Success is perceived as the anomaly; unrelated to enduring programs with continued support, but rather a reflection of heroic acts above and beyond professional norms.
- Scientists still face real social and professional risks if they choose to do engagement. Most prevalent are perceptions that those who do engagement are not serious about science, not competent researchers, or are committing an act of self-promotion. The academy can still feel like a hostile environment to scientists who wish to integrate engagement into their professional lives. This appears to be less of an issue in more applied disciplines.
- Mentors are important, but many are neutral or only tentatively supportive of engagement, few scientists experience mentors who are true advocates in, or partners of, engagement work.
- Department chairs have an important role to play, not necessarily in terms of providing resources or maintaining programs, but certainly in terms of mentoring, cultivating an ethos of engagement, and implementing systems of accountability and reward.

Societal context
- Focus group conversations began with a definition of public engagement as intentional and meaningful opportunities for scientists and members of the public to mutually benefit and learn. The dominant discussion, even among our sample biased in support of engagement, still aspired to increasing the quantity of one-way communication to overcome the public's scientific deficit.
- Current social conditions and public discourse which politicizes science do not appear to deter engagement and, in many cases, scientists are more motivated to improve on and expand engagement activities.

PART II B: INSIGHTS FROM UNIVERSITY PEOPLE

Focus groups elucidated insights from key university positions and people.

Administrative support
Three groups of participants provide institutional, administrative, and supervisory support to scientists in their public engagement endeavors. These include leadership from offices of research, college deans, and departmental chairs or heads.

Leadership in Offices of Research include vice presidents and vice chancellors for research. The group approached the conversation with a systems view, skilled at connecting public engagement to the

strategic mission of the university and, in some cases, land grant status. They acknowledged very real challenges and risks for pre-tenured faculty allocating energies to engagement. Faculty need to be careful and wait until after tenure to do meaningful engagement. This condition breeds cynicism and makes it difficult to retain good faculty who, if they remain in academic life, would likely make significant impacts over the course of their careers. They highlighted the important role of brokers in the system, but also that funding for such roles does not meet the demand. There was no common recommendation on how and where within the university to situate such brokers and offices that facilitate engagement. They identified that promotion and tenure processes have a variety of regulators; in many institutions a faculty senate may be the lever of change, others have top-down mechanisms from provosts and deans. In either case the actual on the ground practice of assessing scientists is ultimately in the hands of chairs and peers.

Deans were able to speak to institutional missions, but also connect to the lived experiences of scientists. They appeared to be better positioned to resource engagement programs and training for their faculty. Deans also mentioned cynicism and fatigue of faculty who "stick their necks out", to collaborate across disciplines and/or communicate with the public. They discussed shifting the narrative of engagement as "service", to a narrative of engagement as productively enriching research questions and processes.

There is a tendency to pile engagement on top of an already overwhelming workload, but these deans believe there are opportunities to be more strategic and help faculty make calculated decisions about tradeoffs. Deans noted that quality engagement cannot happen in the absence of robust relationships with partners and enablers, citing the time to develop and maintain such relationships is significant and itself a barrier to success. There are growing opportunities for faculty to participate in engagement programs, contribute to the literature on engagement, and innovate engagement practice. However, there is a need for more institutionalized and dependable financial and human resource support to realize such opportunities. Funding agencies have a role and can move the needle in this regard.

Deans spoke to the role of department chairs, mentioning that college level resources (training and programs) rely on chairs to encourage their faculty and carry messages about the importance of public engagement. The most important role for chairs is to support the culture change by communicating the value of engagement with their faculty and supporting shifts in the practices of promotion and tenure. They noted that chairs have few drivers to support public engagement as the outcomes do not directly factor into departmental budgets or necessarily meet the demands of students. It is not clear what a chair gains by shifting energy away from curriculum, faculty management, conflict resolution, etc. to support engagement.

Chairs did not respond to requests for participation in focus groups. The study team decided to alternatively conduct informal conversations with three chairs in very different disciplines to learn about individual perceptions and understand more about the constraints of the role. Aligned with the notion of deans, chairs acknowledged that there are few drivers to motivate their support. In particular encouraging young faculty to engage can muddy the waters for their promotion and tenure review. They viewed engagement as a good thing for everyone to do, but not necessarily a priority.

Concerns that academic peers sometimes perceive engagement as distasteful self-promotion were prominent in the faculty group. The chairs, on the other hand, had a mixed views on the matter ranging from concern (natural science department), to neutrality (industry connected department), to the notion that self-promotion should be encouraged and is necessary to survive in academia (applied interdisciplinary department). This points to the vast differences between departments in terms of size,

structures, level of teaching responsibility, scale of research activity, facilities, and degree to which the work connects to industry or policy makers. Even within a very small sample of chairs the perceptions of roles in supporting public engagement ranged from no role, to aspirations to be more supportive, to serving as an active facilitator and broker of engagement.

Boundary spanners and facilitators

Two distinct types of boundary spanners who facilitate scientists' engagement work participated in focus groups. Although these groups approach their work differently, they share a common practice of connecting scientists through robust networks in which they have invested significant energy to construct and maintain. Both groups demonstrated strong understanding of faculty norms of practice and common challenges associated with engagement.

Government and public relations professionals serve as critical facilitators between scientists and the public usually by connecting scientists, or in some cases scientific discoveries, to policy processes and the media. They do this with a lens of the university mission and intent of promoting value created by the institutions. They focused on facilitating one-way communication from the university out, but aspired to a more responsive two-way communicative approach. This group is keenly aware of the need for improved incentives and, unencumbered by the cultural constraints of science, presented direct solutions about reform in the reward structure. Their practice emphasized efficiency; focus on the faculty who are good at engagement and want to do it, and avoidance of faculty who distrust administration or are reluctant. They considered their work over the long-term, making more investment in junior faculty to amplify potential over the course of a career.

Brokers and engagement professionals work in many different capacities including extension and outreach focused programs. An additional role, the broader impacts professional, has been emerging over the last five years. Inclusive of extension and outreach professionals, but expanded to include members of the National Alliance for Broader Impacts and their peers, this group is specifically responsive to NSF broader impacts criteria. They are building capacity and university infrastructure for broader impact success. They tend to work through the life cycle of projects from grant submission through evaluation. Our focus group represented brokers broadly who reported that they track, develop, and enhance engagement opportunities across several university departments, but also in collaboration with schools, community organizations, science centers, and a variety of other regional programs. The brokers appear to be the only group with a critical eye on systemic efforts to improve infrastructure and evolve engagement practices. They devise strategies to meet scientists where they are and empower them to not only conduct engagement, but to learn and improve practice in the process.

Although they experience a lot of support from the university, it generally comes in the form of accolades. These individuals and offices are entrepreneurial in piecing together funding, but the unpredictable nature of their financial support has consequences for retention of people and sustainability of programs. Additionally, the number of scientists they are able to support is constrained by the unstable nature of support. Evaluation of their own successes is a difficult challenge for brokers. They all feel they must find a way to do it, but to do so would reduce their capacity to provide support for scientists. It is difficult to make a compelling case for the return on investment for these types of offices as neither the support, nor the engagement activities, are revenue generating. Some make the case by tracking scientists' success rates on grants relative to the average.

Scientists

Scientist and engineer participants included tenured faculty, early career faculty, postdocs, and graduate students all relatively successful in their public engagement efforts. Acceptance of the university system, with all the constraints it places on engagement, unsurprisingly increased with experience. Those retained in the system have found ways to conduct engagement despite institutional, capacity, and cultural limitations. Those earlier in their careers take advantage of flexibility as they explore their trajectory in science. All described their success as a product of bootstrapping, working around the system not within it. Another common thread is their conception that in early career outreach is only something to tackle if everything is going well with research, in which case one may add engagement to an already large workload. Their stories are consistent with many ongoing observations and studies. The scientists who participated in focus groups each have prior experience with public engagement and opted to volunteer their time to speak about their public engagement experiences; they are potentially unique from many of their peers in terms of motivation and interest in public engagement.

Faculty successful with public engagement held the common belief that engagement activity is risky beyond the promotion and tenure process. They characterized risk as socially constructed by outdated perceptions and beliefs about the scientists who do outreach. For example, the idea that outreach and engagement is a form of self-promotion, conducted as an alternative professional activity by otherwise incompetent scientists, or science that can be explained to the public is not serious or important. This is juxtaposed by the feelings of deep satisfaction scientists report once they are tenured can expand pursuit of engagement. Aligned with other studies, the group noted that these holdover social constraints are changing over time, but the pace is too slow.

Postdoctoral and _Graduate Student_ participant conversations had comparable themes. Most were questioning their future in the academy. Those who were actively pursuing academic jobs were hoping to find an institution that would value their desire to build an engagement portfolio alongside their research and teaching. They identify two flaws in the widely help hope for the future generation of scientists to create a culture of engagement. 1) Attrition, those who really value engagement are unlikely to stay in the academy, and 2) those who do value it and stay in the academy are likely to downgrade their level of engagement to fit within disciplinary norms and improve job security.

They were entrepreneurial in their approach building systems and clubs to gather likeminded peers to seek training and develop programs. They noted how difficult it was to find dependable support and believed that modest, but more consistent, financial support and mentorship could enable sustainability of their work and allow future students to build on their successes overcoming some of the challenges of the obviously high turnover among students and postdocs.

Engagement was perceived as a binary option for postdocs, either their position included it or not. They did have the freedom and agency to pursue training or experiences in their quest to diversify their skill sets. Graduate students in particular describe that their mentors' support of their engagement activities amounted to lip service. Although they pursue training and opportunities to do engagement, they do not generally discuss this with their advisors. Some ask permission, others deceive their advisors to avoid their outreach activities being used against them in the instance that they struggle with their research.

Below are levers of change worthy of expansion, refinement, and prioritization for action. Each emerged from themes repeated across the literature, focus groups, discussions with chairs, and other related national conversations and studies. Some of these actions are already in place, some the object of experimentation and innovation, and others generated through this landscape process. They can serve as a baseline upon which to shape and build an expanded set of possible solutions.

Assert urgency and invest in sustainable strategies

Support for engagement is urgently needed to keep pace with a quickly changing society. Investments should adopt a framing of ugency *and* answer that call with strategic and sustainable evidence-based initiatives that both improve economy of scale and enable innovation of engagement practices.

Evolve promotion and tenure processes to build on recent successes and emphasize local solutions

A comprehensive investigation and analysis could help in understanding how promotion and tenue processes are already changing and how to add thoughtful momentum to the transformation in progress. Findings should be applied to local processes that explicitly include and assess a variety of engagement activities. Public engagement activity should be decoupled from "service" and explicitly inserted into stated institutional priorities and budget processes. Customized engagement objectives should be embedded into departmental plans and scientists' position descriptions.

Assess value in meaningful ways

Establish processes that assess engagement productivity in terms of both enhanced research processes and societal impacts. Avoid attempts to express value in terms of return on investment or simple metrics (e.g. participation hours and grant procurement). Instead, collaborate with social scientists and humanities scholars to develop rubrics about the value of a variety of engagement activities.

Enhance professional supports

Three key opportunities surfaced in the landscape process. 1) Expose the actual investments of time needed to successfully implement different engagement activities to enable transparent consideration of tradeoffs with other activities. 2) Support brokers to magnify the effects of existing programs and facilitate scientists' success, especially for early career or reluctant scientists who may not otherwise find success in their engagement efforts. 3) Investigate the lived experiences of pre-tenured faculty in terms of workload, trajectories, and ways to reduce risks; support them in changing the system from within.

Enhance Practice

The primary opportunity lies with engaging audiences who are underserved with little access to science learning and engagement. Intentional engagement with audiences, beyond the "choir", through collaborative mechanisms can move the system beyond the deficit model and pave the way to realize mutual benefits. Scientists need tools and practices that overcome group self-selection bias. More design research is needed to innovate such tools based on evidence about which practices generate mutual benefit and positive impacts. Trainings should be expanded to include explicit practices for discussing science as a complex endeavor and in the context of values. Trainings should also evolve to include more strategies based on what has been learned from engagement and science communication research.

PART IV: MORE QUESTIONS

This report provides a synthesis and empirical grounding of what is known about university systems and people. Many questions remain, the answers to which can help in pursuit of transformation.

- How might increasing permeability of the boundaries between science and other sectors of society transform both science and society?
- How might engagement practice aimed at improving equity improve overall outcomes?
- What lessons can be learned from efforts to transform university educational practices?
- What are the best cost effective alternatives (to return on investment) that capture value of communication and engagement?
- How might overcoming the deficit model improve the science gap?
- What are the merits and risks of outsourcing engagement to non-scientist professionals? Is the use of evidence-based practices by engagement professionals worth the sacrifice of "authentic" science experiences with working scientists?
- Do underrepresented scientists shoulder an unfair portion of the communication and engagement activity, and if so how does that affect their persistence and advancement?

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