

A Call For Promoting Faculty Innovation & Entrepreneurship *

By

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Abstract

We call for the promotion of faculty innovation & entrepreneurship (I&E), across disciplines, and its recognition in promotion and tenure processes— thereby enabling universities to better serve as a talent and idea engine for the Nation’s innovation economy, and evolve and respond in a time of enhanced societal needs and uncertainty.

Institutions of higher education face unprecedented challenges in serving their students and greater society. Even before the COVID-19 pandemic profoundly disrupted research and education globally, colleges and universities had been working for decades to better respond to societal, student, and faculty needs. For example, higher education has responded to the new educational delivery modes (e.g. online learning, hybrid formats, flipped classrooms, experiential opportunities) and research strategies (e.g. interdisciplinary research, open science, team science, (Bouwma-Gearhart, 2012; Bouwma-Gearhart et al., 2012; Franklin & Peat, 2001; Sá, 2008, Vincent-Lancrin, 2006). These challenges are made more difficult by decreases of financial support to universities, at least public ones, which grow ever more dependent on student tuition dollars (Geiger & Heller, 2012).

The full impact of the COVID-19 pandemic on future student enrollment and revenue is unknown. We do know that federal and state governments are extremely unlikely to fully mitigate the financial damage from this crisis (Murakami, 2020). Tuition costs already seem to be reaching an inflection point, where students and their guardians were weighing the pros and cons of attending college in comparison to alternative educational pathways (Nica & Mirica, 2017; Boyington & Kerr, 2019). [Apple, Google, and numerous other companies](#) are already starting to reimagine high-level employees (and earners) without a college degree.

If universities cannot adapt rapidly and effectively, they face the risk of becoming irrelevant or, at least, serving a diminished societal role in the future. One way to respond to such concerns is by shifting foci at institutions of higher education towards programming that further enhances institutions' contributions to long-term social and economic well-being and makes obvious this impact. This includes an enhanced focus on “learning tracks related to innovation,

design thinking, and entrepreneurship” (Career Interest Survey, 2018) for students and, perhaps more importantly, on the part of faculty.

A recent paper from the Bush Center on The Innovation Impact of U.S. Universities (<https://www.bushcenter.org/publications/resources-reports/reports/universities-innovation-impact.html>) details the societal impact of university-related innovation and entrepreneurship.

The importance of faculty members’ innovation and entrepreneurship (*I&E*) can also be found in the federal government’s fairly recent elevation of such work in federal agency programs:

- The National Science Foundation’s Innovation Corps program (https://www.nsf.gov/news/special_reports/i-corps/about.jsp), which supports university researchers focused on technology commercialization;

- The National Institutes for Health, with its own Innovation Corps (<https://www.niaid.nih.gov/node/11549>) program;

- The US Office of Technology Transitions, which administers the Energy I-Corps Program (<https://www.energy.gov/technologytransitions/energy-i-corps>); and

- The US Department of Commerce/National Institutes of Standards & Technology (NIST), call to action in its [Unleashing American Innovation Green Paper](#) (NIST, 2018).

In this article, we put forth descriptions of faculty I&E, and review results of a 2019 survey across 99 diverse US institutions of higher education, that found misalignment between institutional-level I&E priorities and the current reward system for university faculty. We argue that revisions to promotion and tenure-related structures are needed, to better support faculty and help translate their I&E to enhance academia’s contribution to social and economic well-being. We detail one such structure, the Promotion & Tenure Innovation & Entrepreneurship (PTIE)

Coalition (ptie.org) of 65 institutions from across the country, aiming to align university priorities and faculty reward structures related to I&E.

Definitions and Examples of Faculty I&E

What do we mean here by faculty innovation? Ultimately, faculty innovation involves faculty creations that have a significant impact on a need in society. More specifically, while diverse in goals and impacts, we see *faculty innovation* as the identification or creation of new resources (including methods, services, or technologies) with potential to promote social good (e.g. low-cost water filtration methods, wildfire monitoring systems) and/or with commercial potential (e.g. wearable technology, digital media). We conceptualize *entrepreneurship* as attempting to realize the commercial potential/business opportunities of innovation. Importantly, faculty may or may not engage in entrepreneurship for their innovations. We do not include in our conceptualization of faculty I&E items produced by faculty for teaching and learning, such as course resources (including textbooks, etc.), that do not have obvious direct impact beyond formal academic activities.

Various outcomes are indicators of faculty I&E. Evidence of I&E can be presented as peer-reviewed publications, but much is not. Other evidence includes the starting of companies and being awarded patents and licenses, and industry funding for prototype development; these activities connote innovation with market potential for entrepreneurship. For example, at our home institution, an Associate Professor of Robotics noted a need for “last-mile” package delivery and created a robot that mimics human gait. Through collaboration with the university Accelerator Office and his department, he has trained many graduate students, some of whom he hired at his new company, jumpstarting their industry careers. At our institution, faculty have

described entrepreneurship as the “push outwards” of their innovation, work that “is serving a customer regarding a purpose or mission.”

But some outcomes involve innovations that are less marketable or never intended for market. Examples include providing design assistance to communities around an infrastructure or technology need, or technology transfer to a governmental or nongovernmental organization. Some faculty have conceptualized such innovation, rooted in attending to the greater societal good, “solving a real-world problem” or “translating research into improving people’s lives.” This can include faculty work in the humanities and the liberal arts. For example, one faculty at our institution noted, “innovation can take the form of visual and creative arts that [addresses] a social justice issue.”

For example, at our home institution, the Humanitarian Engineering program is designed to train students and others at the intersection of service-learning, academic research, and local/global social competencies. Faculty and others engaging with the program co-create innovations to enhance life quality and community resilience via innovations that allow for access to clean water and sustainable heating. Many of these innovations will never be marketed, or even distributed beyond a local community, partially because of their context-specific design. Innovations that do eventually find a market might be referred to as the product of *social entrepreneurship*, that “pays extra attention to solving social problems because of its commitment in helping other less fortunate people while building a sustainable venture” (Roslan et al., 2019, p. 1). One faculty member at our institution noted, “everything [I do] starts with community engagement. When I start here, I ask questions that lead to innovations that involve legitimate problems that address a legitimate need.”

I&E as Meaningful, But Less Supported, Faculty Work

Many faculty members are finding I&E activity professionally and personally meaningful. When we have asked faculty at universities about I&E, we have heard comments such as “this gets to the root of what motivates faculty. And dealing with this can make actual change.” And “bringing together individuals from different backgrounds, with different ideas, different world experiences, to solve complex problems that really transform our society today, that is what is exciting.”

I&E work benefits faculty members and their institutions in other ways. Industry connections, patents and commercialization activities, afford faculty funding for research. An institution’s societal impact, including those more entrepreneurial, can be used to recruit & retain talented faculty who are seeking research goals beyond the typical paradigm focused on publications and governmental/private grants (Genshaft et al., 2016; McDevitt et al., 2014; Stevens et al., 2011).

More and more institutions are integrating faculty I&E into their strategic plans (Genshaft et al., 2016; McClure, 2016). Institutional commitment to fostering faculty I&E for those working in STEM disciplines is most pronounced, with over 100 colleges and universities now engaging with the NSF’s National Innovation Network. Students and their guardians can also realize more tangible benefits from their investment in education, including the transfer of knowledge and skills from faculty that enhance their employment potential and societal impact (Demirikan & Spohrer, 2015; Kuratko, 2005; Rothstein & Rouse, 2011). Students who engage in I&E-focused training also enjoy greater postsecondary success overall (Sanberg et al., 2014).

Yet faculty I&E work is not always reflected in traditional promotion and tenure (P&T) metrics, such as in publications. For universities that have an established, innovation-driven culture, such as Massachusetts' and Georgia's Institutes of Technology, significant changes to P&T guidelines may not be necessary. But recent scholarship points to the fact that most universities within the United States (and around the globe) may not have evolved to incorporate I&E priorities within P&T guidelines (APLU Office of Research & Policy Analysis, 2015; Martin, 2012; McClure, 2016, 2015; Nasiru et al., 2015; National Academies of Sciences, Engineering, and Medicine, 2019; Siegel & Wright, 2015; US Department of Commerce, 2013; Rubens et al., 2017).

Our own nationwide survey, in 2019, found misalignment between institutional-level I&E priorities and the current reward system for tenure-track university faculty (see [Bouwma-Gearhart et al., 2020](#), 2021). Respondents from 99 diverse US institutions of higher education largely indicated insufficient structures for evaluation of faculty I&E in considerations of promotion and tenure (P&T). And this was despite a strong desire for such considerations across respondents. Further, across types of institutions, we found that all pertinent organizational levels (e.g. department, institution) struggle to evaluate faculty I&E in P&T considerations. When I&E is evaluated, it is typically considered only somewhat important by P&T evaluators, as an optional activity for faculty. From respondent comments, it seems that those not yet tenured are especially at risk for their I&E work. Though desired, development programs for both faculty and administrators for evaluating of faculty I&E in P&T considerations is practically nonexistent.

Consequently, faculty seem left in the uncomfortable position of balancing their interests in engaging in I&E against P&T criteria that do not prioritize it (regardless of I&E priorities

presented by their institution's strategic plans). Indeed, 21st-century faculty members are looking to institutions to provide opportunities and support to translate their discoveries and inventions to help humankind. For the vast majority of universities, a fundamental expansion is needed in the P&T criterion to inclusively capture the value of I&E endeavors.

Promoting and Rewarding Faculty I&E Through Coordinated Efforts

Despite these headwinds, there is cause for hope that higher education can adapt. Colleges and universities around the country, beyond the Land Grant institutions, have focused more and more on ensuring and articulating their importance to society (Gamoran, 2018). Also, other entities may help ensure the inclusion faculty I&E in P&T criteria. Recently, national organizations and federal agencies such as the Association of Public & Land Grant Universities (APLU) and US Department of Commerce/National Institutes of Standards & Technology (NIST) have drawn attention to this topic through their [Public Impact Research Initiative](#) (APLU, 2019) and the [Unleashing American Innovation Green Paper](#) (NIST, 2018).

Importantly, these organizations and resources draw attention to faculty innovation that also includes products or methods with no immediate market potential but with the potential for enhancing social good. Indeed, a balance must be struck between the societal benefits created by researchers at institutions of higher education and potential financial impacts from that work (e.g. their commercial success). In fact, the academic community might be more comfortable with the societal impact side of innovation. Academics may be concerned with the commercialization of faculty work. To this we offer that commercialization is also a mechanism to maximize societal impact--less of a revenue stream and more as means to demonstrate direct impact on society--beyond traditional academic indicators such as peer-reviewed publications.

Encouragingly, our 2019 survey also found that there is interest in addressing the problem of recognizing faculty I&E within existing P&T structures and processes. Said one respondent “I truly think this is a MASSIVE needs area for bringing higher education into the 21st century and be a hub for true innovation education.” A strong majority of survey respondents from across the country and types of institutions (70%) were interested in working together to support the evaluation of faculty I&E impacts in P&T considerations. Such coordination is critical to any change around this issue.

Of course, changing the culture at one institution around I&E is inherently linked to the culture at other institutions, as a key component of almost all P&T cases involves the evaluation of the candidate’s dossier by experts from other universities (Genshaft et al., 2016; O’Meara, 2002; O-Meara et al., 2011). Consequently, we believe that a collaborative, networked approach that brings together numerous universities to address this topic in a concerted fashion is likely to prove most effective. Survey comments also stressed the need to continue to involve a diversity of institutions in such efforts. “Thank you for building data around multiple institution types and sizes -- private, religious institutions are often quite innovative both inside and outside the definitions you use here. Any emerging coalition should enable inclusion by all institution types.”

The Promotion and Tenure – Innovation and Entrepreneurship (PTIE) Coalition: Accelerating Faculty I&E Impact

With support from a grant from the [National Science Foundation](#), Oregon State University has led the establishment of a Promotion & Tenure Innovation & Entrepreneurship

(PTIE) Coalition (ptie.org) of institutions from across the country to tackle the misalignment between university priorities and faculty reward structures related to I&E. The PTIE effort intends to continue to identify current barriers to, and develop solutions for, the inclusive recognition of I&E impact, including making recommendations and providing metrics for the evaluation of P&T cases detailing faculty I&E impact. The non-binding PTIE Coalition already has [over 65 member institutions](#) and [13 national stakeholder organizations](#), from which at least one representative participated in an inaugural summit in September 2020. At the summit, coalition members created and planned for the adoption of recommendations for expanding P&T guidelines on their own campus (see <https://ptie.org/ptie-recommendations/>).

Importantly, the PTIE effort does not seek to overhaul the traditional mechanisms for evaluating faculty but, instead, to “broaden the bar” of promotion and advancement (National Academies, 2019) by adding to accepted P&T measurements. Such thinking aligns with other calls for expanding the notions of faculty scholarship, including by other writers for *Change* (Elrod, Whitehead, & Huber, 2020). Through strategic and careful work, the PTIE effort hopes to foster system-wide change to recognize faculty’s I&E impact by drawing on experts (internal and external reviewers) with values allowing for effective evaluation of candidates’ dossiers in light of their university-based contexts. The PTIE website (<https://ptie.org>) documents ongoing initiative progress. Institutions and national organizations interested in joining the effort are encouraged to contact PTIE organizers at ptie.info@oregonstate.edu.

The ability to more effectively align the intellectual capabilities of our university faculty with an innovation economy will have profound, far-reaching impacts for society and the American economy. Beyond positive impact for faculty members, institutions of higher education will be better positioned to accomplish their own institutional strategic goals focused

around societal impacts, critical to demonstrate their value to economies and citizens' lives. This includes impact on the circa 20 million students enrolled nationally in our higher education system. Employers more and more are seeking, and willing to pay more for, employees that have I&E knowledge and skills. The continued development of the 21st century professional to be able to adapt and evolve with a rapidly changing workplace environment ensures a resilient and productive workforce.

We stand at a unique moment in time. The confluence of external forces on higher education coupled with the evolving needs of faculty and students provides an opportunity to reimagine the 21st-century higher education institution. If we, as a community, can embrace a *broadening* of the valued impacts of faculty, the entire higher education ecosystem and society as a whole can profoundly benefit.

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Many institutions of higher education have within their strategic plans innovation and entrepreneurial activities, as part of their contribution to the greater good. Yet, recognition of such work by faculty in promotion and tenure processes is not a given. A nation-wide consortium of 65 universities aims to better align institutional and faculty priorities around innovation & entrepreneurship with tenure and promotion processes.

In Short:

- Our 2019 survey found misalignment between institutional-level I&E priorities and the current reward system for university faculty across 99 diverse US institutions of higher education.
- Revisions to promotion and tenure-related structures are needed, to better support faculty and help translate their I&E to enhances academia's contribution to social and economic well-being.
- United by the new Promotion & Tenure Innovation & Entrepreneurship coalition, administrators and faculty are working to create structures and practices to better support and reward faculty innovation & entrepreneurship (I&E), across disciplines.