

Research Innovation Task Force Draft Report

July 1, 2017

Introduction

In February 2017, Executive Vice Chancellor and Provost Scott Waugh charged this Task Force with generating specific recommendations for “three to five actionable items” that will seek to enhance research Innovation at UCLA. Several questions were posed to guide the Task Force’s work:

1. Which existing innovative research areas and programs have the potential, if funded and supported, to become signature programs for UCLA?
2. How can we best support and incentivize research to respond to pressing social needs?
3. How can UCLA best foster collaboration among university researchers from different fields and academic units?
4. What more, if anything, should UCLA do to encourage relationships and partnerships with industry? How can the University best support research entrepreneurialism (start-ups, patents)?
5. How can we increase research support in the current economic and political environment? How can we encourage faculty to pursue extramural funding? What type of administrative infrastructure and staff support are necessary at the unit, school, and campus levels to promote successful grant writing?
6. What obstacles do UCLA faculty to research innovation and how can these obstacles be addressed?
7. How do we make UCLA research more accessible to the public and more visible to policymakers?

Executive Summary

In response to these questions, the Research Innovation Task Force has generated four specific recommendations:

1. Expand the research base to address all available funds
2. Create a public partnership for urban innovation: Downtown UCLA
3. Establish a campus-wide initiative for healthy-behavior innovation
4. Initiate a university-wide research competition for internal seeding of new research opportunities.

1. Expand the Research Base

What: address all available research funding sources

- Coordinated campus-wide effort to identify all possible research funding opportunities beyond traditional sources, including ITAR-restricted programs
- Expand grant and proposal-writing training to students and faculty not proficient in winning external funds

Why: current funding sources have uncertain future

- Proactive initiative needed to grow available research funding

How: develop infrastructure to identify funding opportunities and foster grant and proposal writing

- Identify and coordinate multidisciplinary research proposals
- Faculty and student resource to enhance proposal win rate

When: immediately

- Team with existing campus infrastructure to identify funding
- Provide campus leadership for coordinated proposal writing

2. Downtown UCLA

What: public partnership for urban innovation

- Three key ingredients: interdisciplinary research platform, free educational platform, publicly accessible space
- Scholars partner with civic leaders to tackle issues confronting the city and the region
- Catalyze innovative public demonstration projects
- Improve the quality of everyday urban life

Why: help UC win the public-relations battle

- Demonstrate public mission of UCLA
- Provide effective mechanism to promote research and creative arts relevant to the urban public

How: UCLA-Los Angeles partnership for urban lab

- Promote the public role of UCLA in the City of Los Angeles

When: multiple phases beginning next 6 months

3. Healthy Behaviors Research Initiative

What: campus-wide coordinated health research

- Leverage progress in technology to create comprehensive consumer-centric solutions informed by end-user insights
- Behavioral intervention research enabled by new real-time medical device technology

Why: UCLA has unrivalled capability in this area

- Access to leaders not just in medicine and engineering but also the humanities, psychology, sociology, anthropology, and urban planning to connect all 6 campus research areas

How: win research funding for sustainable health behaviors, create new multidisciplinary center

- NIH/NSF funding above \$200M/year for health behaviors

When: immediately

- Structure new research proposals coordinated campus wide

4. University-wide Research Competition

What: create campus effort to seed new research

- New research competition for faculty and students

Why: enable good ideas to win external funding

- Difficult to obtain external funding for good ideas alone
- Funding for seed research can lead to initial results that in turn enable subsequent program wins

How: coordinated through the VCR's office

- Research competition will over time pay for itself through additional program wins enabled by new research results

When: begin immediately, ramp funding over time

- Initial competition will require some campus funding
- As new research results enabled by the competition are proven to garner new research programs, ramp funding accordingly

Additional Details

The remaining of this report discusses in more detail the Task Force's four recommendations.

1. Expand the Research Base

UCLA has annual research expenditures of about \$1B through approximately 6,000 funded research projects. <http://newsroom.ucla.edu/ucla-fast-facts> Government agencies such as NIH, NSF, DOE, AFOSR and the like account for most of this revenue. The VCR's office does an excellent job helping to identify funding opportunities, but resources to accomplish this are limited. A proactive initiative to identify and coordinate additional funding sources and opportunities would help to expand the research base, especially those associated with multidisciplinary proposals.

One area of research that is not directly addressed is associated with ITAR-controlled opportunities. The International Traffic in Arms Regulations and other related regulations govern the handling of items and services to restrict and control military and defense-related technologies. A significant fraction of research funded by government agencies may be ITAR related. Some universities, such as MIT <http://osp.mit.edu/compliance/export-control/guidance-documents/export-control-regulations/international-traffic-arms> and others are funded to do ITAR-compliant research. UCLA is not addressing a significant fraction of available research funds by not pursuing ITAR-compliant research opportunities.

2. Downtown UCLA

WHAT?

We propose UCLA inaugurate a visionary agenda that makes public our mandate of advanced research and education. Downtown UCLA (DTUCLA) is a public partnership for urban innovation. It has three essential ingredients: an interdisciplinary *research platform*, a free *educational program*, and a publicly accessible *physical space*. Those ingredients catalyze innovative public demonstration projects. The mission of DTUC is to advance interdisciplinary research agendas that have short term and long term impacts on the quality of everyday urban life, and through partnerships, to promote the public role of UCLA in the heart of L.A.'s civic life. DTUCLA enhances the public role of the public research university, demonstrating its value to residents of Los Angeles, the State of California's largest urban laboratory. Simultaneously, DTUCLA benefits from the city's wealth of human, cultural, employment, and educational resources. This proposal focuses primarily on the role of research at DTUCLA, and on the early phases of implementing a satellite campus. There are compelling arguments to be made for the inclusion of a variety of new and existing pedagogical programs in a downtown setting, of which research is a part such as certificate programs, mid-career education, workforce training, civic engagement, community service, and urban apprenticeships.



Research Platform: DTUCLA offers an organizational structure in which interdisciplinary scholars partner with civic leaders to tackle issues confronting the city and region. Rather than focus on a single question or challenge, it is an agile platform to address dynamic urban conditions. Collaborative undertakings, hosted at the DTUCLA campus, are co-sponsored by the City and the University. Thematic issues for research and demonstration projects are set by an interdisciplinary board led by the Chancellor and the Mayor, and their representatives. Examples of significant thematic issues might include: workplace of the future, inventing the healthy neighborhood; research/development of apps that incentivize the share-economy; urban agriculture; community-based, holistic approach to homelessness; public policy for social justice within gentrification; affordable, appealing commercial buildings with sustainably low utility usage; innovative approaches to infrastructure maintenance and community beautification; local community engagement with the contemporary visual and performing arts; or catalysts for the creation of strong urban communities. Such thematic areas would encompass challenging projects entailing collaboration among UCLA groups from the sciences, arts, engineering, social sciences, humanities, and professional schools. For example, within the theme of inventing the healthy neighborhood, investigators from fields of medicine, engineering, and the social sciences might develop wireless health technologies and work to integrate them into new formations of community. Another research collaborative involving performing artists, digital media technologists, educators, and neuroscientists studies a different dimension of healthy communities (cap.ucla.edu/artinaction/special_initatives/coda) and the role of body and brain function in empathy, memory, and community inclusion. Within the theme of buildings with low utility impact, one could imagine projects involving engineers, scientists, and architects to design structures with minimal energy consumption through a combination of solar technologies, improved materials, and innovative design. Innovative approaches to homelessness might engage service providers, cultural geographers, medical researchers, and public policy experts to

integrate medical treatment, job training and placement, and community planning. In some cases, these projects might lead to spin-offs of both for-profit and non-profit businesses.

Research innovation occurs within two time frames with different social impacts. Short-term projects are defined as year-long efforts that lead straightforwardly to real-world demonstrations.



Short term research can be timely, in response to critical, pressing issues. Long-term projects addressing complex, chronic issues are pursued over 4-5 year periods and produce cutting edge research with long term public benefits. Thematic issues rotate on a two- year basis, with two long-term projects and several short-term projects occurring at all times. Teams of researchers, educators, community members, and civic leaders will be chosen to collaborate on-site. and several short-term projects occurring at all times. Teams of researchers, educators, and civic leaders will be chosen to collaborate on-site.

Educational Program: DTUCLA demonstrates that public research and education go hand-in-hand, and perhaps more radically, that these are accessible to the public free of charge. Each year, DTUCLA would offer one crossdisciplinary course to the public via live-streamed lectures that concern a significant issue facing Los Angeles. Hybrid learning platforms, MOOCs, and technology-enhanced learning models couple with face-to-face engagement with researchers and the research setting. Some subset of attendees could take the free course for 4-units of credit. This educational model holds multiple benefits. First, scholars and civic leaders learn from one another through meaningful partnership. Second, thematic research projects can form the basis for course offerings open to selected local high school students, junior college students, or mid-career learners. These students are actively engaged in the research. The coursework and research internships assist students toward admission to UCLA and to DTUCLA certificate programs. Innovative pedagogies that cut across disciplines will be the norm. Third, a public program of evening conversations, lectures, and performances is accessible to all. Lastly, this form of free public educational outreach is capable of generating a city-wide debate about our collective future.

Expanding the Westwood campus into downtown LA is a sustainability plan for the public research university. When teaching and research are integrated as fully as possible in our

diverse urban context, UCLA meets its changing 21st century mandates for greater social impacts, social justice, interdisciplinarity, and inclusivity.



Physical Space: DTUCLA cannot be an office building or classroom building, instead it must be a functioning laboratory and presentation space where experiments can be constructed and displayed, failures can be studied, groups of people can collaborate, and neighbors feel welcome. More like a “test kitchen” than a lecture hall, it is largely open to the public since community members are contributing participants and not simply audience members. It is a warehouse of knowledge, activity, experimentation, performance, demonstration, and debate. It is home to several research teams of 4-8 people each, with flexible seminar rooms, workshop spaces, lecture spaces, and studio/maker spaces. It is a flexible, comfortable, working environment that is more a creative commons than academic precinct. It celebrates the diversity and inclusivity that define Los Angeles. It represents the workplace of the future, where learning and research are critical to the advance of understanding.

WHY?

UCLA cannot afford to wait to implement what should be perceived as the contemporary form of higher education. The decline in state support for the University of California stems from the perception of the legislature that UC funding is a lower priority for voters than other matters. The UC is losing the public relations battle and must become more effective in engaging California voters if we are to convince them of the importance of the research university. Moreover, a large portion of the voting population does not recognize the benefits that UC graduate programs provide to the state economy and cultural life. DTUCLA addresses these issues directly in at least two important ways. First, it reinvigorates and makes more visible the essential public mission of UCLA. Second, it provides an effective site to study, collaborate, and promote applied research and creative arts of relevance to the urban public and to translate its fruits directly to the surrounding community. Los Angeles is an incredibly diverse megacity with a broad spectrum of challenges as well as compelling assets, including its location on the Pacific Rim. As such, it provides UCLA researchers with an extraordinarily rich urban laboratory. But unlike other major cities, Los Angeles has not partnered with universities to facilitate research

and education that improve the quality of urban life. As the region's public university, UCLA should seize the opportunity to partner with the City of Los Angeles. By directly translating innovative research, education, and contemporary creative arts to the public, UCLA engages the community in its research and graduate programs, showing how these improve the lives of Californians in the most powerful manner, while adding an important new dimension to the UCLA academic community.



DTUCLA is a significant and creative addition to the existing strengths of the university. It does not replace traditional scholarship that may require more isolation and abstraction, for example. Instead, it is intended to augment such pursuits by forwarding others that are more issue-oriented, more cross-disciplinary, and more directly impactful. Faculty, staff, and students from all parts of campus can play a role in the DTUCLA. Participants will include the design fields, social sciences, urban studies, arts, humanities, engineering, statistics, biological sciences, health sciences, education, and public components. At present, interdisciplinary studies with social impact are valued highly by university administration, but difficult to undertake by faculty and students. Thus, DTUCLA will also experiment with ways university structures might productively evolve.

Benefits are multiple and multi-directional. The City and region benefit greatly from UCLA's enhanced and extended engagement in the real-world problems that require unconventional approaches. UCLA benefits from challenging its students, staff, and faculty to address complex problems that require hands-on thinking and produce real change. We produce a new generation of graduates who can more confidently engage the dynamic workplace. With our public partners, we create a civic discourse that recognizes the value of experimentation, knowledge generation, community-based experience, and the multidisciplinary foundations of environmental sustainability.

At no time in the recent past has the University had such an opportunity for such a creative, significant transformation. We live in the urban era, in a world growing more metropolitan, facing ever greater problems of social inequity and global environmental catastrophe. The need for collective, cross-disciplinary innovation has never been greater, yet the structures and practices of the university are fundamentally conservative. Establishing this innovative satellite

campus invents a new organ in the university body that can function more effectively in the changing world around it.

This is a new model, but other universities and cities have related entities: MIT has the Media Lab, Columbia has the “StudioX” labs in many foreign cities, Stanford has the D-Lab, and



Harvard has a string of global research hubs. New York has the Regional Plan Association, San Francisco has SPUR, Chicago has numerous university-based urban centers. Among the wealth of urban institutions of higher education in Los Angeles, there is no single, recognizable center that serves as the LA hub of advanced research, engagement, and innovation.

UCLA already has a range of multidisciplinary outreach enterprises on campus; while these will not shape the new undertaking, they serve as models and will contribute to in its programs. Some are fieldwork-based (UCLA lists some 200 community-service oriented programs), some are community-facing (Downtown Labor Center; CAP at the Ace Hotel), others are research and design-oriented (cityLAB-UCLA and Urban Humanities Initiative; StartUp UCLA; UCLA Hackathon, etc), while others are curricular initiatives (field placement programs of the Luskin School)

HOW?

The launch of DTUCLA will require a negotiated partnership between LA’s Mayor and UCLA’s Chancellor. The Mayor’s office will provide insight into compelling issues of importance to the City as well as access to key personnel in City offices to partner with UCLA faculty, students and staff. The Mayor and Chancellor will need to identify a building or buildings in a downtown community for lease or purchase, near a Metro stop with easy connection to the Purple Line that will serve UCLA, that can function as an urban lab, meeting location, and presentation space. Additional UCLA resources might include:

- distributed teaching (that is, participating faculty will be encouraged to teach a part of their courseload for and at the DTUCLA)

- course buyouts for research time
- development staff to fundraise for future initiatives
- funds to create public programs, working prototypes/demonstrations
- resources and support for community participation

To determine the content of programs, a small group (8-10 total) of campus, civic leaders and City personnel should convene to create a participatory process. Modeled on the Mellon Foundation’s process for setting up major new initiatives, a series of small, focused workshops will be held to consider themes, procedures, programs, as well as formats. From those workshops, leaders for the first years’ teams will be selected to submit proposals.



WHEN?

DTUCLA must be approached ambitiously, thoughtfully, and in a timely manner. To do so means it must be implemented in phases in order to open doors to temporary quarters quickly, and to a permanent home after three to four years. Off-campus programs such as the Ideas Campus of UCLA’s Architecture and Urban Design department demonstrate the feasibility of this timeline. LA’s cultural institutions like Temporary MOCA, now the Geffen Contemporary, exemplify the powerful dynamism such facilities can embody.

- In the first six months, a city-university public partnership must be established between the Mayor’s office and the region’s public university, UCLA. A very compact administrative team must be created, with a Director and small staff. At the same time, a temporary physical space must be located while searching for a long-term home. Start-up funds (or bridge funds, until effective development efforts are in place) must be committed.
- In the next six months, leadership for the DTUCLA is created in the form of (1) a DTUCLA Board, which oversees fundraising and participates in setting research initiatives, and (2) a DTUCLA Brain Trust, which finalizes decisions about programs and initiatives

and is comprised of university and city members. The latter should be small and relatively self-governing.

- At the start of the second year, some part of DTUCLA will launch in the temporary space; the above-mentioned workshops will be implemented, proposals accepted, and teams formed to launch full programs at the start of year 3. One public course will be offered.
- By the end of year 3, research will be completed for one short-term initiative and one demonstration project will be made public. The long-term DTUCLA facility will be habitable. At this point, the permanent home for DTUCLA should be functioning.



3. Healthy Behaviors Research Initiative

Why Healthy Behaviors?

Health care - which already accounts for 18% of the US GDP - is undergoing a dramatic transformation. Health systems and payers are under increasing cost pressure - driving them to seek more sustainable approaches. A distinct megatrend is the growing transition of healthcare delivery from treating disease to prevention and keeping patients healthy. The exploding burden of chronic disease (obesity, heart disease, diabetes, etc) has been accompanied by the growing realization that over 70% of our healthcare expenditures (by some estimates, \$1.8 trillion of the \$3 trillion spent on healthcare in 2015) are lifestyle related and result from mutable behaviors including poor diet, lack of physical activity, smoking and drinking. New pills for hypertension or diabetes are of less interest to those who pay the bills. Instead, payers are focusing more on prevention, rather than treatment. Since chronic diseases progress slowly and have a strong behavioral component, health systems are increasingly interested in new approaches that can drive desirable behavioral change. This interest is manifest in the growing intersection of mobile phones, sensor-enabled wearables, cyberinfrastructure, population health, precision medicine, sociology, cultural anthropology, bioethics, big data analytics and human centered design. Termed variously as mHealth, digital health or smart and connected health, these newer approaches focus on behavioral interventions for risky health behaviors, extending service

to resource-poor locations and vulnerable populations, and improving population health outcomes and medical system efficiency.

Beyond healthcare systems and payers, sustainable health behaviors have engendered a lot of governmental and commercial interest. Within the past few years, NIH/NSF funding of health behaviors-related research has grown to over \$200 million per year and NSF established an entire new program devoted to technologies to monitor health behaviors and support just in time behavioral interventions. In addition, the potential to grab a piece of the nearly \$3 trillion spent on healthcare in the United States alone, not to mention a slice of the fitness and wellness market, has attracted the attention of corporate behemoths such as Microsoft, Apple, Google, Qualcomm, Intel, Samsung, Nike, GE Healthcare and AT&T. Take, for example, Apple which has identified wearables for measuring health behaviors as a strategic initiative and has been aggressively hiring some of the world's premier experts in mobile medical technologies for the development of its all-in-one health tracking app (Healthbook) and the corresponding iWatch that tracks daily activity, heart rates and eventually, calorie consumption blood pressure, hydration, and glucose levels. Samsung recently announced a wearable wrist sensor called Simband to stake its claim on reimagining mobile health. The market-share aspirations of these companies are reflected in the large projected outlays for their digital health R & D; GE Healthcare alone plans to invest \$1 billion over the next five years to accelerate the development of sensor systems and technologies for measuring, monitoring and modifying health behaviors . Overall, the digital health market of \$1.3 billion is projected to grow to \$20 billion by 2018.<http://www.forbes.com/sites/parmyolson/2014/06/12/exclusivegoogle-to-launch-health-service-google-fit-at-developers-conference/>).

The early expeditions into behavioral health have also rendered manifest the growing chasm between the industry-based technologists and the eventual end-users, namely, the healthcare providers and the patients. The rapid proliferation of “technology-centric” solutions, developed without any end-user input, has resulted in a landscape littered with innovation that have little clinical uptake and minimal public health impact. Recognizing that the academic setting often provides the perfect blend of fundamental and applied innovation, subject-matter experts and healthcare delivery systems, the technology teams at the Google, Apple and Samsung are increasingly partnering with select universities to develop comprehensive, consumer-centric solutions that are informed by end-user insights. For instance, Samsung recently established an innovation lab at UCSF for digital health technology; Stanford has the NIH-funded [Mobilize](#) center that focuses on technology for enabling physical activity. The strategic and substantial institutional investments by MIT, UCSD, USC, Stanford, Duke, and Northeastern Universities into their digital-health programs manifest their desire to stake out a leadership role and monetize their “in-house” innovation. But, given that the field of digital is relatively nascent, a clear academic leader, with a critical mass of thought-leaders and activities, is yet to emerge.

Why UCLA? A leading public, research university embedded in the singular ethnic, economic and cultural mosaic that is Los Angeles, UCLA offers an unrivalled set of features for

establishing a world-class ecosystem for studying and treating health behaviors, especially in vulnerable populations. The unique comprehensiveness of the UCLA campus and the geographic proximity of the nine professional schools, medical center and the UCLA College facilitate interdisciplinary connections and enable exciting new bridges between disciplines to be created. Our geographic and intellectual proximity is particularly relevant to Behavioral Health which has strong humanistic underpinnings. The ready access to thought leaders in not just the humanities (philosophy, literature, art, music, history and language) but also psychology, sociology, anthropology, law, urban planning and management, should allow our increasingly technology-centric campus to look beyond its technological fixation and reductionism to reconnect with the sources (individual, interpersonal, and community) of unhealthy behaviors and the sociocultural contexts of chronic disease. Importantly, the study and modulation of health behaviors could be a dominant thread connecting all 6 of the research areas identified by the campus community: 1) Transforming Urban Communities; 2) Sustainability; 3) Big Data and Cyber Infrastructure; 4) Precision Medicine and Targeted Health Care; 5) Global Competitiveness and International Engagement; and 6) Educating the Workforce for the 21st Century. Furthermore, health behaviors will allow us, as a public institution, to develop a unique niche while addressing the pressing needs of our local communities.

4. University-wide Research Competition

The intent of this initiative is to identify campus research efforts that with some help, development support, and campus funding could be used to win large external funding. Faculty and students often have new ideas that could be used to seed initial projects whose results could in turn be leveraged in new proposals. Good ideas alone are often not sufficient to win a new research project, whereas a good idea with initial results that support the premise of the idea has a much higher probability of becoming a winning proposal. Overhead generated by these new programs could be used to support the competition so that over time the effort is investment neutral but results in overall additional research funding and programs for the campus.

In December 2016, the Office of the UCLA Vice Chancellor for Research identified five “Critical Research Directions”: 1) Transforming Urban Communities; 2) Energy and Environmental Sustainability; 3) Big Data and Cyber Infrastructure; 4) Precision Medicine and Targeted Health Care/Therapeutics; and 5) Global Competitiveness and International Engagement (see Appendix). This list may provide the first themes for a university research-wide competition that can bring researchers from multiple disciplines and from North and South campus together to work on specific research projects.

Appendix:

Office of the Vice Chancellor for Research. *UCLA Recommendations on UCOP White paper Concepts: Critical Research Directions for 2017 and Beyond*, December 2016.

UCLA Recommendations on UCOP White Paper Concepts Critical Research Directions for 2017 and Beyond December, 2016

Among the critical areas for U.S. research contributions in the next decade, especially (but not exclusively) by the University of California, are described in the following list. This list was culled from suggestions by UCLA's Deans and Vice Provosts. It describes research/problem areas on which the talents of a powerhouse in transdisciplinary research, such as the University of California, can be brought to bear most effectively. This list is not in a prioritized order.

- 1. Transforming Urban Communities.** With a focus on the inner cities, this research area involves research on housing and homelessness, central city economic vitality, services, policies, sustainable urban systems, education, and infrastructure. Research to transform the health and well-being of urban communities will necessarily involve contributions from units in urban planning and architecture, public policy, social sciences, business, public health, law, humanities, and education, potentially employing research tools enabled by work in engineering, mathematics, medicine, and other fields.
- 2. Energy and Environmental Sustainability.** Robust and reliable sources of energy, water, transportation, and food will continue to pose challenges in the coming decades. Ensuring and maintaining clean air and water and responsibly providing for diversified and economically viable energy sources (as well as efficient energy storage) will require contributions from a host of fields, including engineering, physical and life sciences, public health, public policy, social sciences and humanities, and economics and law.
- 3. Big Data and Cyber Infrastructure.** The requirements and tools required for research involving massive datasets continue to expand as applications in a wide range of fields continue to grow. Big Data research capabilities are having an extraordinary impact on problems in genomic data mining and development of treatment methodologies, market and economic trends, populations and patterns in behavior, migration, and health issues, and much more. Cyber security as well as cyber infrastructure are key challenges in this arena. Contributions in fields relevant to the application are key here, in addition to investment in STEM (science, technology, engineering, mathematics) fields, especially computer science and engineering.
- 4. Precision Medicine and Targeted Health Care/Therapeutics.** The ability to design individualized treatment and prevention of disease is predicated on the ability to account for individual variability in genes, in addition to environmental and lifestyle distinctions. Here, too, capabilities in data mining, but more fundamentally in analytical and diagnostic tools and methodologies, can have an enormous impact. Contributions from health sciences fields (medicine, nursing, public health, etc.) as well as computer science and engineering, mathematics, and physical and life sciences are key to advances in this arena.
- 5. Global Competitiveness and International Engagement.** The US' international engagement and relational footprint is likely to only grow in response to worldwide events and pressures. The ability to understand and contribute in an increasingly interconnected planet requires research emphasis in patterns of international social engagement, migration, and educational, political,

and economic trends. International engagement and awareness is a hallmark of the education of students in the 21st century research university.

6. Educating the Workforce of the 21st Century. An overarching challenge this century is the primary mission of research universities, that of educating students who will become part of the workforce of the future. The critical thinking skills that students acquire in college and especially in graduate study involving fundamental research can prove to be life-changing in terms of societal impact. An ability to communicate effectively, of course, is essential to be able to have such impact, and thus there is an important role for performance, the arts and storytelling in transforming 21st Century society.