Appendix D. Report of the JTFSO Subcommittee on Research and Graduate Education
April 30, 2014

Background: Phase I Planning

The Phase I strategic planning document emphasizes the importance of research and defines the campus's distinctive role in research and graduate education:

UMass Amherst will be known as an innovative, responsive and rewarding partner for investment with clear areas of national and international research strength, and the capacity to work collaboratively in creating knowledge and putting ideas to work. ...

Our research strength and our programs in graduate education are core drivers of our impact. It is through these efforts that we advance the frontiers of knowledge and disseminate those insights throughout society (p. 22).

The Phase I document also notes the importance of excellence in research and the need for intentional resource allocation to maintain and grow high-impact research programs that make us a partner of choice:

Our ability to serve the public good through innovation rests in large part on the quality and impact of the research and scholarship we undertake. Quality, in turn, is a function of the wisdom of the choices we make in selecting and supporting research priorities. In our increasingly competitive environment no institution can be all things to all people. Our strategy therefore focuses on opportunities that have high potential impact, and that we can pursue at a high level of quality (p. 22).

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[One] dimension of excellence in innovating for the public good is aligning our priorities with those of the society we serve. This can take many forms...[;] the point is to recognize and demonstrate our obligation to employ society's resources with which we have been entrusted — including our time and the opportunities that provides — in ways that repay that investment. Exactly how alignment occurs and is evaluated will vary (e.g., direct economic vs. developmental, long vs. short term), but as a public research university our contributions to meeting society's needs should always be evident (p. 24).

Phase I of our strategy also articulates eleven shared values that should guide our actions: Excellence, Leadership, Responsibility and Stewardship, Social Progress and Social Justice, Innovation, Discovery and Impact, Engagement, Diversity Equity and Inclusiveness, Opportunity, Openness and Integrity, Integration and Collaboration. These institutional values set the context for research priorities and demand that we connect our research to the community to accomplish and demonstrate both innovation and impact.
Phase II Planning

Phase II moves the strategic plan further toward implementation. A new question that Phase II planning poses to the Research and Graduate Education Subcommittee is this: what might be some areas of research focus that build on UMass Amherst's strengths and intersect with important state, regional and national priorities? The identification of these areas of focus will help to guide early decision-making and investment. Looked at another way, what concrete illustrations can we offer of current and emerging alignments of our strengths and priorities and “those of the society we serve”? We stress that our focus here is on (i) research and (ii) the priorities of external (state, regional, national and international) partners.

This aspect of Phase II planning is not intended to suggest that all campus research should be captured in these focus areas. As noted above, these areas lie at an intersection with externally-defined interests. Overall campus priorities are shaped by numerous institutional considerations and shared values, as well. The production of knowledge, both for its own sake (not aligned with an immediate external priority) and to create future focus areas as our institutional strategy evolves, is also critical. Other institutional priorities, including outreach and community engagement (see the recommendations of the JTFSO committee on Outreach and Community Engagement) and internationalization (e.g., as evidenced by our participation in the American Council on Educational Internationalization Lab, and as discussed in a forthcoming draft Internationalization Plan) also inform and define our overall research investment strategy.

As with most of our planning challenges this is a matter of informed judgment, but given the Phase I goal of “promoting a culture of evidence,” this judgment should be based on explicit criteria and well-defined processes. As a community of scholars we have many sources of insight on which to draw: formal comprehensive assessments (e.g., the Doctoral Program Review); specialized disciplinary perspectives; experience with granting and policy-making agencies; awareness of larger societal trends; and so on. If as a community we can mobilize and focus our insights and perspectives, we can begin to bring our strategic priorities into practice.

To start that process, members of the JTFSO Research Subcommittee and members of the Task Force on Strategic Planning of the Faculty Senate Research Council brainstormed a list of broad research areas that lie at the intersection of campus strengths and external needs and priorities. This list is not intended to be definitive, but it can serve to illustrate potential metrics and processes for determining what lies at this intersection. More generally, the Phase II report here is being presented to stimulate feedback and discussion as part of a process that will ultimately help orient subsequent campus planning, including the next phase of unit planning and ongoing campus investment strategies. It is offered to begin a process that will evolve over time as our strengths and our understanding of society's needs evolves. It is expected that this list will change, not only as a result of immediate feedback but also more gradually, as external priorities change, and as other areas of institutional strength emerge.

At this time, the campus community is asked to contribute to this dialogue in three ways: (i) to reflect on and react to this draft, including any and all suggested challenges, affirmations, expansions, deletions or reconfigurations; (ii) to suggest potential areas of emerging intersection (“emerging” as a consequence of emerging UMass Amherst strength, emerging external need, or both); and (iii) consistent with an emphasis on “evidence-based intentional resource allocation,” to provide feedback on these sources of evidence: metrics and perspectives (e.g., Doctoral Program Review rankings, external rankings, level of engagement with external partners reflecting
excellence) and processes for continuous informed assessment of quality, and of external partner priorities.

**Suggested Areas of Existing Intersection between Campus Strengths and State, Regional or National Priorities:**

- **Advanced materials and manufacturing.** Historic research strengths of the campus in material science and nanotechnology have been well-recognized nationally as demonstrated in the Doctoral Program review, the NRC study, and other rankings, and have received substantial extramural funding in competitive programs at the National Science Foundation and the Department of Energy. The Obama administration has identified advanced manufacturing as a high priority and the federal government has funded several “advanced manufacturing institutes.” A parallel conversation in Massachusetts has established an Advanced Manufacturing Collaborative linking several universities, including UMass Amherst, to government and industry leadership, and to new funding opportunities.

- **Applied life sciences and health.** Several campus programs are widely recognized for research strengths in life sciences in the recent Doctoral Program Review, National Research Council study, extramural funding, and student demand. A number of these were the subject of extensive engagement with private sector and state government entities for nearly a year, culminating in a $95 million capital investment to establish a new Institute for Applied Life Sciences in 2013. Other very strong programs in science and engineering align with national priorities, e.g., in biofuels.

- **Cognitive science.** From the Doctoral Program Review and other sources, we know that the campus has considerable strength in the study of human cognition from diverse perspectives (e.g., language, psychology, computation, learning and development) and with varied methodologies (e.g., inquiry, experimentation, modeling, imaging). The President’s recently announced BRAIN initiative is an indicator of federal interest in this area, as are NSF’s RFP Stimulating Integrative Research in Computational Cognition and NIH’s call for Modeling Social Behavior Research Project Grants.

- **Creative economy.** Massachusetts has recognized the “creative industries” as a significant component of its statewide economic development strategy, explicitly calling out architecture, visual arts, design, film and media, digital games, music, and publishing among their list of creative industries. The campus has broad strength in related areas as evidenced by national and international awards and the creative economy is especially well suited for engagement and impact in the region.

- **Data science, computing and analytics, computational social science (CSS).** Our campus has several graduate programs with activities in these areas that were highly ranked in the Doctoral Program Review and are among the approximately dozen programs that Academic Analytics ranks in the top two quintiles (40%) of their disciplines. A number of these graduate programs are also highly ranked by USNWR, and are successful in peer-reviewed, competitive federal funding programs. These activities are well-positioned to take advantage of opportunities such as the Commonwealth’s recently announced Big Data Initiative (and similar federal priorities) and activities in social and behavior science such as

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- **Energy, climate science, sustainability.** A broad range of sustainability issues pervade public debate and private investment decisions at every level. UMass Amherst makes significant contributions in areas such as renewable energy, climate science, and public policy. Large-scale national centers such as the Northeast Climate Science Center (one of eight national centers established by the Department of the Interior), and the NSF ERC for Collaborative Adaptive Sensing of the Atmosphere (competitively awarded) are indications of activities at the intersection of both research excellence and federal priorities.

- **Equity and Inclusion.** As Chancellor Subbaswamy noted in his inaugural address, this campus has a long tradition of research on issues of social justice, inequality, and discrimination. This research spans many departments; the perspectives taken are those of social science, economics, public policy, public health, education, history, women’s studies, literary and cultural studies, and the arts. State, regional, and federal interest in understanding the root causes of inequality and identifying solutions varies in focus and intensity, but it never disappears entirely. Its current importance is not in doubt.

In thinking about this list, the subcommittee members aimed for broad areas of research and scholarship vs. specific programs (although relevant programmatic strength should obviously underpin broader areas, as noted above). There was also a keen understanding that state, regional and national priorities are sometimes manifested in specific funding channels and sometimes not, and that even when funding is available it varies dramatically.

**Possible Areas of Emerging Intersection**

While it is important to recognize existing strengths that intersect with external priorities, it is also crucial to identify areas of emerging strength and emerging external interests at this intersection. This is an even more open-ended inquiry, but the subcommittee believes it is important to begin to stimulate this thinking as the campus transitions to unit planning next fall. At that time the question of “intersection” will be posed to individual units, but those conversations should occur in the broadest possible campus context so as not to miss emerging interdisciplinary strengths that result from the synergistic sum of a number of smaller scale efforts within different units.

As an example, supporting entrepreneurship has become a high priority for Massachusetts state government in the life sciences,2 and more broadly in regional economic development3 (a key impact area for state research funding). Federal funding agencies also recognize innovation and

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entrepreneurship as emergent, e.g., in the recently established NSF i-Corps program,\textsuperscript{4} recently joined by the NIH.\textsuperscript{5} Beyond these areas of sponsored research, entrepreneurship is emerging as an important global priority, and an ingredient in social impact, e.g., via non-profit organizations and NGOs.\textsuperscript{6}

We note that this report – intentionally and perhaps narrowly focused on the intersection of UMass Amherst’s current and emerging research strengths (as based on data from Academic Analytics and our own DPR) and externally-defined (state, regional and national) priorities – is but the beginning of a broader, long-term, and explicit discussion and continuous re-evaluation of our campus’ research priorities. As noted above, there must be many components to this sustained, broader discussion as we move in to Phase III of strategic planning, with unit-planning playing a critical role in defining these research priorities.

\textsuperscript{4} \url{https://www.nsf.gov/news/special_reports/i-corps/}
\textsuperscript{5} \url{https://chronicle.com/article/NIH-Joins-NSF-Program-to-Teach/145897/}
\textsuperscript{6} See \url{http://www.gemconsortium.org/} generally and \url{http://www.gemconsortium.org/docs/download/376} in particular.