Accelerate 2025: UTSA’s Framework for Top Tier Research
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Ricardo Romo, Ph.D.
President
The University of Texas at San Antonio

“Continued excellence and growth in research is one of the essential pillars of our strategy as UTSA rapidly evolves to a Tier I institution.”
— Ricardo Romo

C. Mauli Agrawal, Ph.D., P.E.
Vice President for Research
Peter T. Flawn Professor

“Over the past decade, the research portfolio at UTSA has grown significantly. With this framework, we intend to reach even higher levels of achievement.”
— C. Mauli Agrawal
EXECUTIVE SUMMARY

Our goal is to become a nationally recognized research university to benefit our local and regional communities while having global relevance and impact. Accelerate 2025: UTSA's Framework for Top Tier Research was conceived through collaboration and in-depth discussions across all levels of faculty and leadership and is a representation of what can be achieved by working together. This framework illustrates how the University is poised to become a top tier research institution, and also delineates what we must do to achieve this goal.

To achieve the vision of becoming a top tier institution, UTSA has identified eight pathways to success:

- Invest in faculty to increase funded research
- Capitalize and promote areas of research excellence:
  - Advanced Materials
  - Cloud, Cyber, Computing, and Analytics (C3A)
  - Integrative Biomedicine (Human Immunology and Infectious Disease, Neurosciences, and Regenerative and Molecular Medicine)
  - Social and Educational Transformation
  - Sustainable Communities and Critical Infrastructure
- Reward scholarly excellence
- Enhance graduate and undergraduate research
- Strengthen and expand research partnerships
- Enhance research infrastructure
- Increase the impact of university innovations
- Build effective communications

First and foremost, UTSA must invest in its faculty by providing them with the tools necessary to increase the quantity and quality of proposal submissions. UTSA must also recruit more faculty members with established research programs and associated extramural funding. Additionally, the institution must capitalize on its strengths by further building the five areas of research excellence where UTSA already has national recognition and a notable volume of research. Building upon this success, UTSA can then focus on new, emerging areas of research and build a substantial research portfolio.

A key to this success will be the development of strong graduate and undergraduate student researchers who can further enhance research. In addition, it is imperative that UTSA continues to recognize and reward scholarly excellence and academic achievements attained by its faculty.

As the federal funding climate becomes more stringent and funding agencies encourage increased collaborations, UTSA must look outward and further strengthen its research partnerships with academic, federal, and private institutions. By building lasting partnerships with national laboratories and other research-based organizations, UTSA can share its knowledge and facilities, while gaining access to experts and an array of resources.

UTSA must also enhance its research and communication infrastructure. By optimizing its research space and critical components such as high speed Internet, instrumentation, and core computing facilities, UTSA can better serve its researchers. The University must also facilitate and increase the flow of information both to internal stakeholders and to external entities.

Finally, as these pathways develop, the University should increase the impact of its innovations. UTSA can build a campus-wide innovation ecosystem with the strategic growth of faculty, students, infrastructure, and its research portfolio. This system will encourage cross-disciplinary programs, faculty engagement with industry, and commercialization of technology and ideas—all of which are crucial for university advancement.

UTSA has seen tremendous growth in the past 10 years. Research expenditures have increased from $15 million to $51 million, the student population has grown by 9,000 students, and there has been an unprecedented surge in commercialization and entrepreneurship. Going forth, by adhering to this research framework, UTSA can build on this exceptional foundation to become a Tier One research institution by 2025.
Accelerate 2025: UTSA’s Framework for Top Tier Research is a guiding document for the targeted growth of research activity at The University of Texas at San Antonio (UTSA) over the next decade. Institutional level resource allocation and decision-making will be directed towards strategies aimed at achieving four measurable objectives, with the overarching goal to be a nationally recognized research university with global impact.

Objectives:
1. $100 million in sustained annual research expenditures.
2. Top tier institutional status for research within the State of Texas.
3. Top 5% of Hispanic Serving Institutions (without a medical school) in research.
4. Carnegie Classification designated as research-intensive.

1. INTRODUCTION

The Texas Legislature has identified eight state universities that have the potential to become top tier research-intensive universities, including UTSA. As UTSA continues to pursue this top tier status, and become a premier public research university, a concerted effort must occur across all sectors of the university to increase the volume and standard of research performed at the institution. Faculty led research is a fundamental component of the drive to top tier. Thus, the senior leadership of the university must develop appropriate strategies, identify resources, and create an institutional culture that supports research activities as faculty build, maintain, and sustain top tier research and scholarly programs.

2. UTSA RESEARCH PROFILE

2.1 Current Status of Research Funding

UTSA experienced a sustained growth in research expenditures from Fiscal Year (FY) 2003 through FY 2011. However, in FY 2012 and 2013, there was a decline in such expenditures (Figure 1). Although during this period the availability of federal research funds decreased due to budgetary constraints, other universities in The University of Texas (UT) System demonstrated the ability to maintain or expand extramural funding awards and subsequent research expenditures, even in a stringent federal funding climate. According to the Texas Higher Education Coordinating Board (THECB) Research Expenditure Summary FY 2013, research expenditures at Texas public universities and health-related institutions increased 4.3% and 0.5% respectively, compared to the previous year.

Figure 1: UTSA 10-Year Research Expenditures (2003-2013)

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Along with the growth and decline of research expenditure experienced at UTSA, a reflective trend can be seen in sponsored program funds. From FY 2012 to FY 2013, a decrease of nearly $5 million in sponsored program funding was experienced, having an impact on research expenditures across all programs at UTSA. Moving forward, a primary objective for UTSA is to ensure that the decrease in research funding does not continue in future years and that UTSA reestablishes a trajectory of rapid growth in research expenditures, with the goal to reach $100 million.

Table 1: Five Years—Source Funds for All Sponsored Programs at UTSA

<table>
<thead>
<tr>
<th>Source Funds</th>
<th>FY 2009</th>
<th>FY 2010</th>
<th>FY 2011</th>
<th>FY 2012</th>
<th>FY 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Funding</td>
<td>$41,057,673</td>
<td>$41,566,446</td>
<td>$45,424,374</td>
<td>$46,946,521</td>
<td>$41,864,422</td>
</tr>
<tr>
<td>State/Local Grants</td>
<td>$3,621,464</td>
<td>$3,487,130</td>
<td>$3,685,041</td>
<td>$3,780,767</td>
<td>$3,472,541</td>
</tr>
<tr>
<td>Institutional Designated</td>
<td>$2,743,514</td>
<td>$2,726,344</td>
<td>$5,339,489</td>
<td>$6,814,671</td>
<td>$5,490,367</td>
</tr>
<tr>
<td>Institutional General</td>
<td>$15,159,458</td>
<td>$16,359,676</td>
<td>$19,480,989</td>
<td>$14,211,417</td>
<td>$16,756,668</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>0</td>
<td>0</td>
<td>$19,286</td>
<td>$61,029</td>
<td>0</td>
</tr>
<tr>
<td>Private (Foundation)</td>
<td>$4,845,349</td>
<td>$6,001,372</td>
<td>$5,518,939</td>
<td>$5,939,897</td>
<td>$5,398,414</td>
</tr>
<tr>
<td>Total</td>
<td>67,427,458</td>
<td>70,150,967</td>
<td>79,468,118</td>
<td>77,754,302</td>
<td>72,982,411</td>
</tr>
</tbody>
</table>

The National Science Foundation reports annually on higher education Research & Development (R&D) expenditures among US institutions. Of high-Hispanic-enrollment institutions, UTSA ranked number 10 out of 61 in FY 2011 in R&D expenditures by all source of funds. An objective of this framework is to elevate UTSA to the top 5% of Hispanic Serving Institutions (without a medical school).

Table 2: Higher education R&D expenditures at high-Hispanic-enrollment institutions, ranked by R&D expenditures, by all source of funds: FY 2011 (dollars in thousands)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Institution</th>
<th>All R&amp;D Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of New Mexico</td>
<td>$220,565</td>
</tr>
<tr>
<td>2</td>
<td>University of Texas, Health Science Center, San Antonio</td>
<td>$198,655</td>
</tr>
<tr>
<td>3</td>
<td>New Mexico State University</td>
<td>$139,062</td>
</tr>
<tr>
<td>4</td>
<td>University of California, Riverside</td>
<td>$132,238</td>
</tr>
<tr>
<td>5</td>
<td>Florida International University</td>
<td>$110,006</td>
</tr>
<tr>
<td>6</td>
<td>San Diego State University</td>
<td>$106,591</td>
</tr>
<tr>
<td>7</td>
<td>University of Texas, El Paso</td>
<td>$74,067</td>
</tr>
<tr>
<td>8</td>
<td>University of Puerto Rico, Medical Sciences Campus</td>
<td>$64,017</td>
</tr>
<tr>
<td>9</td>
<td>CUNY, City College, New York</td>
<td>$60,404</td>
</tr>
<tr>
<td>10</td>
<td>University of Texas, San Antonio</td>
<td>$58,667</td>
</tr>
</tbody>
</table>

2.2 Current Student and Faculty Profile

According to the UTSA Student Enrollment Fact Book, in FY 2013 the institution had 28,623 students (Figure 2). This was a decrease from FY 2011 (30,968) and FY 2012 (30,474), as the university elevated eligibility criteria to increase the caliber of students accepted into programs, bringing the institution’s student body closer to that of a top tier university. As a result of strong emphasis on enrollment management, UTSA anticipates one of the largest incoming freshmen class in 2014. Additionally, UTSA graduated a record approximately 5,800 students in FY 2013. Despite the elevation in admission standards, the diversity of the student body has not declined. The diverse student population at UTSA reflects the university’s success in meeting its mission to provide access to excellence.

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3 University of Texas at San Antonio, Student Enrollment Fact Book, Fall 2013 (UTSA, 2014), 10 http://utsa.edu/ir/pub/factbook/2013/StudentEnrollment.pdf
The number of tenured, tenure-track and non-tenure track faculty has slightly increased over the past five years, from 1,307 in Fall 2009 to a total of 1,445 faculty serving at UTSA in Fall 2013. In measuring the impact of a university's research portfolio and faculty body, there are several considerations above and beyond research expenditures. Faculty awards, endowment assets, and National Academy memberships also factor into a university's status, including the achievement of top tier status. According to The Texas Higher Education Coordination Board, Accountability System, UTSA has significantly increased the number of Endowed Professorship and Chair positions since FY 2001, with a total of 46 such positions filled in FY 2014. These positions provide an opportunity for the university to leverage return on endowments toward research strategies, such as hiring new research-intensive faculty.

Table 3: Number of Endowed Professorships and Chairs at Tier One Emerging Texas Institutions

<table>
<thead>
<tr>
<th>University</th>
<th>Fall 2000</th>
<th>Fall 2012</th>
<th>Fall 2013</th>
<th>% Change from Fall 2000 to Fall 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTSA</td>
<td>7</td>
<td>39</td>
<td>46</td>
<td>557%</td>
</tr>
<tr>
<td>Texas Tech</td>
<td>26</td>
<td>118</td>
<td>118</td>
<td>354%</td>
</tr>
<tr>
<td>Univ. of Houston</td>
<td>N/A</td>
<td>198</td>
<td>210</td>
<td>N/A</td>
</tr>
<tr>
<td>UT Dallas</td>
<td>20</td>
<td>87</td>
<td>87</td>
<td>335%</td>
</tr>
<tr>
<td>UT Arlington</td>
<td>15</td>
<td>33</td>
<td>35</td>
<td>133%</td>
</tr>
<tr>
<td>Univ. of North Texas</td>
<td>10</td>
<td>22</td>
<td>23</td>
<td>130%</td>
</tr>
<tr>
<td>UT El Paso</td>
<td>30</td>
<td>59</td>
<td>61</td>
<td>103%</td>
</tr>
<tr>
<td>Texas State Univ.</td>
<td>0</td>
<td>16</td>
<td>16</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Figure 2: Five Years—Student Enrollment for all Degree Levels

The number of tenured, tenure-track and non-tenure track faculty has slightly increased over the past five years, from 1,307 in Fall 2009 to a total of 1,445 faculty serving at UTSA in Fall 2013. In measuring the impact of a university's research portfolio and faculty body, there are several considerations above and beyond research expenditures. Faculty awards, endowment assets, and National Academy memberships also factor into a university's status, including the achievement of top tier status. According to The Texas Higher Education Coordination Board, Accountability System, UTSA has significantly increased the number of Endowed Professorship and Chair positions since FY 2001, with a total of 46 such positions filled in FY 2014. These positions provide an opportunity for the university to leverage return on endowments toward research strategies, such as hiring new research-intensive faculty.

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<td>26</td>
<td>118</td>
<td>118</td>
<td>354%</td>
</tr>
<tr>
<td>Univ. of Houston</td>
<td>N/A</td>
<td>198</td>
<td>210</td>
<td>N/A</td>
</tr>
<tr>
<td>UT Dallas</td>
<td>20</td>
<td>87</td>
<td>87</td>
<td>335%</td>
</tr>
<tr>
<td>UT Arlington</td>
<td>15</td>
<td>33</td>
<td>35</td>
<td>133%</td>
</tr>
<tr>
<td>Univ. of North Texas</td>
<td>10</td>
<td>22</td>
<td>23</td>
<td>130%</td>
</tr>
<tr>
<td>UT El Paso</td>
<td>30</td>
<td>59</td>
<td>61</td>
<td>103%</td>
</tr>
<tr>
<td>Texas State Univ.</td>
<td>0</td>
<td>16</td>
<td>16</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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* Texas Higher Education Coordination Board, Accountability System – Faculty Information (THECB, 2014)
  http://www.txhigherereddata.org/Interactive/Accountability/UNIV_FactInfo.cfm?FICE=010115
An additional consideration in understanding the excellence of a research university’s faculty body is the number of faculty receiving national awards and National Academy memberships. Over the past two years there have been several faculty at UTSA with National Endowment for the Humanities Awards, NSF Career Awards, and several visiting Fulbright American Scholars. These awards are recognized by THECB as a measurement of scholarly success, in addition to a metric for measuring top tier university status by the Association of American Universities, the Carnegie Foundation for the Advancement of Teaching and the Center for Measuring University Performance. There is significant opportunity for UTSA to increase the number of faculty with nationally or internationally recognized awards through both internal support of existing faculty and through the focused hiring of faculty with existing awards.

2.3 Current Funding Climate

Funding awarded by federal agencies, such as the Department of Health and Human Services (HHS) and the National Science Foundation (NSF), comprise the vast majority of research monies available within universities. In 2013, the impact of the budget sequestration was seen in the funds of most, if not all, federal programs and agencies. The FY 2014 Omnibus Appropriations Bill marked an increase of funding to these agencies, although this was not an ‘across the board’ restoring of funding to pre-FY 2013 funding levels. In FY 2013, similar to the past 10 years of funded research, the majority of extramural funding at UTSA was supported by awards from HHS, mainly through the National Institute of Health (NIH) as shown in Figure 3. UTSA faculty, with the assistance of the leadership at all levels, should pursue funded research through an expanded portfolio beyond the HHS.

2.4 Attributes of Top Tier Status

UTSA is ranked among the world’s top 100 universities under 50 years old, and it holds its place as number 103 of the U.S. institutions ranked by the Center for World University Rankings. These rankings are based on performance indicators including research, citations, teaching, international outlook, and industry income. UTSA is one of only eight U.S. universities ranked in Times Higher Education’s list of top young institutions around the world. Although UTSA has risen in visibility within ranking mechanisms such as the Times Higher Education report, there remains an overarching goal to achieve top tier status.

Within the academic community, there are three organizations that are generally accepted as national arbiters of an institution’s rank as a top tier (Tier One) institution. They are the Association of American Universities, the Carnegie Foundation for the Advancement of Teaching, and the Center for Measuring University Performance, which issues Top American Research University (TARU) reports. Recognition by any of these three is taken as an indication of Tier One status.

Carnegie’s RU/VH (Research University / Very High) classification is the highest of three categories given to research universities and is considered the equivalent of Tier One status. To be classified as a Research University, an institution must award at least 20 research doctorates. The “Very High” level of research activity is based on the level of research activity using two indices. One index represents the aggregate level of research activity, and the other captures per-capita research

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University of Houston, Tier One FAQ’s (June, 2014) http://www.uh.edu/about/tier-one/tier-one-faq/#whatistierone

Carnegie Foundation for the Advancement of Teaching, Carnegie Classifications Methodology (June, 2014) http://classifications.carnegiefoundation.org/methodology/basic.php

Accelerate 2025: UTSA’s Framework for Top Tier Research
activity using the expenditure and staffing measures divided by the number of full-time faculty whose primary responsibilities were identified as research, instruction, or a combination of instruction, research, and public service. According to the Carnegie Foundation, UTSA is currently considered a Research University with a “High” level of research activity.

3. Pathways to Top Tier Research University

After extensive review of the UTSA research portfolio, significant contributions from the deans and faculty, and a study of best practices at other institutions, a series of defined pathways have been identified that will propel the university towards its goal to be a nationally recognized top tier research university.

3.1 Invest in Faculty to Increase Funded Research

3.2 Capitalize and Promote Areas of Research Excellence

3.3 Reward Scholarly Excellence

3.4 Enhance Undergraduate and Graduate Research

3.5 Strengthen and Expand Research Partnerships

3.6 Enhance Research Infrastructure

3.7 Increase the Impact of University Innovations

3.8 Build Effective Communication

3.1 Invest in Faculty to Increase Funded Research

For UTSA to achieve recognition as a top tier university, it is necessary to increase the average extramural funding per faculty member. UTSA is currently lagging in the Federal R&D Expenditures to full-time equivalents (FTE) Faculty Ratio, when compared to its peer institutions in the state of Texas (see Table 4), according to the THECB Research Expenditures Summary Report, FY 2013.

Table 4: Federal R&D Expenditures to Full-time Equivalent (FTE) Faculty Ratio (FY 2013)

<table>
<thead>
<tr>
<th>University</th>
<th>Federal R&amp;D Expenditures</th>
<th>*FTE Faculty</th>
<th>Federal R&amp;D Expenditures/FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas Tech</td>
<td>28,831,113</td>
<td>910.11</td>
<td>31,679</td>
</tr>
<tr>
<td>Univ. of Houston</td>
<td>59,267,080</td>
<td>847.08</td>
<td>69,966</td>
</tr>
<tr>
<td>UT Dallas</td>
<td>33,919,687</td>
<td>398.33</td>
<td>85,155</td>
</tr>
<tr>
<td>UT Arlington</td>
<td>30,816,565</td>
<td>547.30</td>
<td>56,307</td>
</tr>
<tr>
<td>UT El Paso</td>
<td>38,253,167</td>
<td>470.70</td>
<td>81,269</td>
</tr>
<tr>
<td>For all 5 universities</td>
<td>38,217,522</td>
<td>634.70</td>
<td>64,875</td>
</tr>
<tr>
<td>UTSA</td>
<td>29,078,431</td>
<td>529</td>
<td>54,988</td>
</tr>
</tbody>
</table>

* FTE Faculty Indicates number of full-time equivalents (FTE) for tenured and tenure track faculty with teaching responsibilities based on Fall 2012 THECB reports.

Research expenditure growth can occur by increasing productivity of existing faculty (intrinsic growth) and by hiring new faculty (extrinsic growth) in areas with demonstrated scholarly success and potential growth. Intrinsic growth can be achieved by implementing strategies that lead existing faculty to increase quantity and quality of proposal submissions. This will lead to amplified research revenues, resulting in increased annual research expenditures. In order to complement intrinsic growth, new faculty hires with established research programs and associated extramural funding, including potential members of National Academies in areas of excellence should be recruited above and beyond normal.

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annual hiring patterns at UTSA. Embedded within this strategic hiring campaign, UTSA should also strive to increase the number of UTSA Endowed Chairs and Professorships available for exceptional faculty. Through utilization of endowment returns for a portion of faculty salaries, sufficient salary savings maybe accrued for hiring additional faculty.

A strategic goal of faculty recruitment should be to achieve a critical mass, often referred to as a “cluster” of faculty, in established areas of research excellence (see Pathway 2). Cluster hiring initiatives at universities have been a proven method for advancing a university’s status, in many examples catapulting a university towards top tier status. Cluster hiring can be implemented as an alternative or in addition to usual departmentally-based hiring practices. Examples of cluster hiring initiatives can be seen with the University of Houston, Case Western University, University of North Carolina, University of Virginia, Penn State, University of Iowa, and the University of Wisconsin (see Appendix B). In most circumstances, successful hiring initiatives have been attributed to clear hiring guidelines, augmented recruitment committee structure, early considerations towards retention, and full university support.

Reoccurring objectives of cluster hiring initiatives at these example universities include:

- Enabling a campus to devote a critical mass of faculty to an area of knowledge that would not be addressed through existing departmental structures.
- Providing a platform for new and innovative research tracks and collaborative opportunities.
- Addressing complex societal problems, many times linked to regional or global initiatives.
- Encouragement and fostering of cooperation within an already strong faculty base.
- Creation of new curricular offerings at the undergraduate and graduate levels that enhance the research portfolio of the university.

In order to achieve $100 million in annual research expenditures, UTSA must recognize the constraints and risks of solely depending on existing faculty for research growth. Figure 4 shows a model depicting a potential research expenditure growth timeline scenario, based upon two conditions: 1) Existing faculty can continue to grow the research expenditure at an annual rate of 4% (the average growth for Texas public universities in FY 2013 was 4.8%) starting at $51 million in research expenditures in FY 2013 (dotted line); 2) A total of 60 new research-exemplary faculty can be strategically hired (15 each year starting in FY 2016 through FY 2019) with the expectation of $250,000 per faculty member in new annual research expenditures on the average (dashed line). It is anticipated that these faculty will also be able to grow their research expenditures at an annual rate of at least 4%. Collectively, existing and newly added faculty can provide adequate growth towards the goal to reach and exceed $100 million annual research expenditures by FY 2025 (solid line). Figure 4 presents just one possible scenario for growth. Other similar models can be built based on chosen rates of intrinsic growth, number of new faculty desired, and timeline to $100 million.

Significant to the research enterprise is the research support framework available to existing and newly hired faculty. Additional investments should be made in early and mid-career faculty by creating and enhancing professional development and mentorship programs. Through the recently established Faculty Center at UTSA, faculty development programming can be embedded to assist early-career faculty groups in establishing a strong research foundation, while developing mid-career faculty towards more intensive research programs. Other examples of suggested enhancements to the research support framework include, but are not limited to:

- Expanding professional development activities that inform researchers on federal funding agencies’ missions, structures, funding mechanisms, and the ways in which to engage and successfully secure research collaborations and subsequent funding.
- Providing opportunities for researchers from across campus to get to know each other’s research programs (faculty mixers, interdepartmental lectures, etc.) and expand this model with external research partners (e.g., the University of Texas Health Science Center (HSC), Southwest Research Institute (SwRI) and Texas Biomedical Research Institute (Texas Biomed)).
- Increasing staffing support to facilitate multi- and interdisciplinary research teams in pursuit of large, highly focused extramural funding opportunities.
• Stimulating multi- and interdisciplinary research through seed funding provided by VPR and the Colleges.
• Enhancing UTSA’s searchable database of faculty expertise and expand knowledge of this resource internally to faculty and externally to partners such as the HSC, SwRI and Texas Biomed.
• Expanding access to proposal development support (writing, editing, compiling required materials, and mock peer review) and enhance visibility of funding opportunities through direct communication and use of web-based tools.
• Increasing the number of Career Award applications and awardees, through targeted support in proposal development, revision, and resubmission for promising faculty within their first three years at UTSA.
• Facilitating course buy-out processes to afford faculty time to complete funded research obligations.
• Executing comprehensive reviews of Research Centers and Institutes (RC/I) for productivity, faculty engagement, contribution to the research enterprise, and support.
• Establishing an Academy of Distinguished Research Scholars to reward research excellence and develop best practices.

Figure 4: Projected Research Expenditure Growth Model assuming 4% intrinsic and extrinsic annual growth with 15 new hires per year for four years.

3.2 Capitalize and Promote Areas of Research Excellence
Understanding that a university cannot be known for excellence in all fields, areas of existing research excellence at UTSA have been identified. These areas carry the potential to further leverage significant extramural funding opportunities. Based on a critical mass of existing faculty, five-year funding history, publication and citation success, record of research partnerships at the local, regional and national levels, as well as input from leadership in the colleges, five well established Areas of Research Excellence have been determined. These areas are consistent with,
but more focused than, those outlined in UTSA's Strategic Plan 2016. Leading with investment in these areas will provide the best opportunity to expeditiously increase overall research expenditures and faculty research productivity.

**Areas of Research Excellence** (see section 4 for details)

1. Advanced Materials
2. Cloud, Cyber, Computing and Analytics (C3A)
3. Integrative Biomedicine
   - Human Immunology and Infectious Diseases
   - Neurosciences (including psychology)
   - Regenerative and Molecular Medicine
4. Social and Educational Transformation
5. Sustainable Communities and Critical Infrastructure

UTSA's Research Centers and Institutes (RC/Is) form networks of interactions that support the broadest research goals of the university. UTSA has 13 research centers and 8 research institutes, which generate over half of the university's research expenditures (UTSA Research 2013 Annual Report)\(^8\). During FY 2013, 75% of RC/Is submitted one or more proposals in collaboration with another research center or institute. With growth in the five strategic Areas of Research Excellence, connectivity and collaboration among the RC/Is will continue to increase. New faculty hires in these areas should be linked to RC/Is, where appropriate, to create synergy among researchers and to increase submission of collaborative proposals. The strategic research areas will also advance disciplinary, multidisciplinary and interdisciplinary research at UTSA. RC/Is should be carefully reviewed for productivity, faculty engagement, contribution to the research enterprise, and supported accordingly.

An expected advantage of increased grant funding yielded through focused investments within the Areas of Research Excellence is that other areas of research at UTSA will benefit from increased recovery of overhead or Facilities and Administrative (F&A) costs. UTSA holds a significant portfolio of emerging areas of research excellence that either are not traditionally well funded, as dictated by historical federal funding priorities, or have the potential to obtain significant extramural funding but are still emerging at UTSA. These areas can be further supported through programs funded by F&A returns, such as seed grants, travel grants and graduate student support (see Figure 5).

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Examples of these emerging areas of research excellence include:

- Anthropology
- Archeology
- Biochemistry
- Biomechanics
- Globalization
- Kinesiology
- Manufacturing
- Space Sciences
- Wireless Communications
- Economic Development

3.3 Reward Scholarly Excellence

To be a premier research institution, it is essential that UTSA faculty be recognized as leaders in their fields. Recognizing and rewarding scholarly excellence is closely aligned with UTSA’s vision and core values and an important component of the pathway to top tier. A balanced approach that includes both symbolic recognition, as well as financial incentives, will demonstrate UTSA’s commitment to support current faculty and attract additional high caliber faculty to join or collaborate with UTSA. As some funding agencies increasingly demand collaborative multi- and interdisciplinary research teams, UTSA should take a proactive approach to encourage this type of engagement. However, solitary work in several sub-disciplines remains optimal, and these endeavors should be recognized and supported as well.

UTSA should further explore potential tools for effective merit evaluation such as measurement of grants and contracts, number and amount of major grants ($500,000 and above), and emphasis on prestigious competitive federal research awards. As a current focus of the sponsored projects office at UTSA, a shared-credit process for recognition of each college and faculty member’s efforts per project is under implementation. This process should be continuously monitored and improved where necessary to ensure accurate capturing of researcher effort.

Additional measures should be considered for scholarly excellence in research areas that are not traditionally measured by extramural funding success. Measures should include publications, reviewed books and articles, books ranked by
press or evaluated in published book reviews, as well as editorships. Articles ranked according to journal circulation, citation rates, and impact factors can also be considered to measure faculty excellence. In the arts, analogs to refereed publications, such as juried exhibits and compositions performed on the national stage are a prospective measurement.

Symbolic recognition of scholarly excellence can include formal acknowledgments of faculty contributions. An Academy of Distinguished Research Scholars should be established to reward research excellence and develop best practices. College fellows should receive funding to support professional travel, graduate students, and outreach or other professionally enriching activities. In addition, scholarly excellence should be continuously promoted through recognition in UTSA publications, at UTSA-sponsored events, and through awards granted or named in the honor of faculty with significant research achievement.

3.4 Enhance Undergraduate and Graduate Research

In 2013, UTSA created the Office of Undergraduate Research (OUR), with the vision of promoting access, advancement, and excellence in undergraduate (UG) research and scholarly activities. The initial goals of the OUR included: highlighting undergraduate participation in research through the inaugural 2014 UTSA Undergraduate Research Showcase, enabling access to UG research by expanding the number of funded UG research opportunities, and acting as a clearing house for information on UTSA UG research programs and resources available for UG research training. It is paramount that UTSA continues to support and encourage growth of UG research, as this function serves as a pipeline to future graduate students, potential research staff, and future scholars at UTSA.

As a complement to the efforts of the OUR, the Graduate School has also outlined strategic initiatives that will assist in leading UTSA towards tier one status. These initiatives focus on:

- Recruiting more top master’s students through expedited admission processes.
- Enhancing retention efforts to enhance graduate student graduation rates.
- Encouraging and supporting training grants to assist and grow graduate student enrollment.
- Providing financial support to foster excellence in research and post-graduation marketability of UTSA graduate students.

UTSA’s rise to a top tier research university will require strong graduate programs, especially in the Areas of Research Excellence outlined earlier. New graduate programs, both at the MS and PhD levels, will have to be considered for some critical areas and established expeditiously.

3.5 Strengthen and Expand Research Partnerships

San Antonio provides a distinct opportunity for UTSA to forge partnerships as the city is home to several large research institutions such as SwRI, Texas Biomed, HSC, and San Antonio Military Medical Center. UTSA holds strong ties with these organizations, and with focused strategy, these partnerships can be further expanded to propel UTSA to top tier status and enhance the profile of San Antonio as an internationally known research community. Each of these partnerships offers resources and expertise that can be applied in joint research collaborations for pursuit of large scale, federal funding opportunities. Partnerships also exist with companies, such as CPS Energy, Rackspace, and Microsoft, all of which have substantial operations in the San Antonio area. These partnerships could be further expanded and other such partnerships should be cultivated regionally and nationally.

As a means to expand and create more impactful partnerships with federal agencies, UTSA must invest effort in advising researchers on the types of federal agencies that offer research opportunities to universities and the resources in which to pursue research partnerships and funding. Particularly important is that UTSA identifies and pursues more opportunities that are directly targeted to Minority Serving Institutions (MSI’s)/Hispanic Serving Institutions (HSI’s). To compound its competitive edge, UTSA should also consider partnering with other UT System MSI’s/HSI’s for greater capability and proposal impact.

Assessing the current Technology Readiness Level (TRL)\(^9\) (Figure 6) of current research projects at UTSA will allow leadership and researchers to understand where they will be competitive for federal funding, specifically with agencies such as the Department of Defense (DoD), Department of Homeland Security (DHS) and, in many cases, private-sector industries linked to the federal government. Understanding where current research programs stand in the TRL (basic, applied, advanced or operational) will assist decision makers in devising strategies to pursue and be competitive for funding through the aforementioned agencies. Additional efforts should target expanding the federal funding portfolio through non-traditional partnerships under mechanisms that have the potential to increase research expenditure growth (e.g., Cooperative Research and Development Agreements (CRADA), Consortium Membership, and Software Agreements).

National laboratories are federally-funded research and development centers (FFRDC)\(^{10}\), operated and staffed by private corporations or academic universities under contract to the government. While UTSA has partnered with the Sandia National Laboratory and Oakridge National Laboratory on several research projects, efforts are underway to greatly expand partnerships with other national laboratories (see Table 5), where UTSA’s areas of research strength closely align. In order to expand these partnerships, information on each national laboratory’s mission and associated research funding opportunities should be distributed to both faculty and student researchers. Opportunities include fellowships performed at the federal facilities or funding for research that may be conducted on the UTSA campus.

Table 5: National Laboratories and Federally Funded R&D Centers

<table>
<thead>
<tr>
<th>Laboratory Name</th>
<th>Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ames Laboratory, DOE</td>
<td>Lincoln Laboratory, DoD</td>
</tr>
<tr>
<td>Argonne National Laboratory, DOE</td>
<td>Los Alamos National Laboratory, DOE</td>
</tr>
<tr>
<td>Brookhaven National Laboratory, DOE</td>
<td>National Renewable Energy Laboratory, DOE</td>
</tr>
<tr>
<td>Fermi National Accelerator Laboratory, DOE</td>
<td>Oak Ridge National Laboratory, DOE</td>
</tr>
<tr>
<td>Fredrick National Laboratory for Cancer Research, NIH</td>
<td>Pacific Northwest National Laboratory, DOE</td>
</tr>
<tr>
<td>Idaho National Laboratory, DOE</td>
<td>Princeton Plasma Physics Laboratory, DOE</td>
</tr>
<tr>
<td>Jet Propulsion Laboratory, NASA</td>
<td>Sandia National Laboratory, DOE</td>
</tr>
<tr>
<td>Lawrence Berkeley National Laboratory, DOE</td>
<td>Savannah River Laboratory, DOE</td>
</tr>
<tr>
<td>Lawrence Livermore National Laboratory, DOE</td>
<td>SLAC National Accelerator Laboratory, DOE</td>
</tr>
</tbody>
</table>

As a HSI, UTSA is well positioned to leverage its location in San Antonio as a gateway to nearby countries. The Institute for Economic Development (IED) has established an extensive network of Small Business Development Centers (SBDC’s) throughout Mexico, Central America, the Caribbean and Latin America with funding assistance from the U.S.

Agency for International Development (USAID), the Organization of American States, the U.S. Department of State, and the governments of collaborating countries. The IED has a proven record of developing external partnerships by building upon, and leveraging, existing relationships to create deep, lasting ties with strategically targeted institutions and funders. This can serve as a model approach in UTSA’s research expansion efforts.

The UTSA Mexico Center also has strong external partnerships with bi-national academic institutions and non-profit organizations, think tanks, and citizen diplomacy organizations. The Mexico Center’s outreach activities include organizing conferences, hosting visiting Fulbright Scholars, inviting distinguished speakers, and promoting cultural exchanges which bring significant international recognition to UTSA. The Bank of America Child and Adolescent Policy Research Institute (CAPRI) and the Center for Cultural Sustainability have deep roots in the public, private, and Non-Governmental Organization (NGO) communities. This historical base has been built and can be further leveraged to strengthen and develop new synergic relationships that offer multidimensional mutual benefits both in San Antonio and internationally.

An emerging area of study that is critical for Texas, and will move UTSA closer to tier one status, is the Eagle Ford Shale, which has significant implications for unconventional oil and gas development, and is located in close proximity to San Antonio. UTSA has a strong foundation in Science, Technology, Engineering and Math (STEM) fields that directly lead to research in energy, water, urban planning, demography, and economic development, expanding the frontiers of knowledge in these fields. Leveraging and strengthening interwoven activities regarding the Eagle Ford Shale will bolster the capacity, relevance, and impact of these disciplines in the region.

### 3.6 Enhance Research Infrastructure

As UTSA strives to meet the target of $100 million in annual research expenditures, it is prudent to consider research space needs and plan in advance. As part of this analysis, we need to consider the current space availability as well as future needs. For both determinations, the analysis below uses data from the Texas Higher Education Coordinating Board for FY 2013 for the eight Emerging Research Universities in Texas.

<table>
<thead>
<tr>
<th>University</th>
<th>Research Space sf</th>
<th>Research Expenditures</th>
<th>Productivity, $/sf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas Tech</td>
<td>563,225</td>
<td>$137,563,727</td>
<td>$244</td>
</tr>
<tr>
<td>Univ. of Houston</td>
<td>608,054</td>
<td>$107,201,997</td>
<td>$176</td>
</tr>
<tr>
<td>UT Dallas</td>
<td>337,445</td>
<td>$98,842,525</td>
<td>$293</td>
</tr>
<tr>
<td>UT Arlington</td>
<td>465,788</td>
<td>$77,651,828</td>
<td>$167</td>
</tr>
<tr>
<td>UT El Paso</td>
<td>282,237</td>
<td>$76,740,368</td>
<td>$272</td>
</tr>
<tr>
<td>Texas State Univ.</td>
<td>163,734</td>
<td>$37,053,191</td>
<td>$226</td>
</tr>
<tr>
<td>Univ. of North Texas</td>
<td>254,568</td>
<td>$32,463,048</td>
<td>$128</td>
</tr>
<tr>
<td>For all 7 universities</td>
<td>2,675,050</td>
<td>$567,516,684</td>
<td>$212</td>
</tr>
<tr>
<td>UTSA</td>
<td>281,758*</td>
<td>$51,417,892</td>
<td>$182</td>
</tr>
</tbody>
</table>

*This does not include the approximately 13,000sf of effective new research space in the North Paseo Bldg.

If the average research space productivity, $212 per square foot ($/sf) of the other 7 emerging research universities in Texas is used as a benchmark (see Table 6), UTSA needs to increase its productivity by $30/sf to meet the average of the other institutions.

If UTSA were to attain the benchmark of $212/sf, with the current research expenditures of $51,417,892 it would need 242,537sf of research space. However, UTSA currently has 39,221sf more available than this requirement, given that it has a total of 281,758sf of research space. This indicates that there is not an immediate shortage of research space at UTSA. Existing space can be allocated more efficiently to accommodate additional research faculty. If new research-
productive faculty are each allocated 1,000sf of space on the average, the current space should be able to accommodate approximately 39 new hires. If on the average these 39 new research-intensive faculty each generate $375,000 per year in research expenditures, they would potentially add $14.6 million to our research, taking UTSA to approximately $66 million in annual research expenditures.

Institutions that have either met or are close to meeting the THECB established target of $100 million in annual research expenditures perform at an even higher level of space productivity (Table 6). Their average research space productivity is $238/sf. If UTSA were to attain this level of productivity it would have enough existing research space to accommodate 65 new faculty.

Increased research productivity and efficiency per unit space can be achieved by the sharing of existing labs by multiple researchers who are part of research clusters focused on specific areas. Some remodeling of space maybe needed to enable this paradigm. The currently available research space can carry UTSA forward significantly, but will not be able to support annual research expenditures of $100 million. Using the benchmark of $238/sf, when UTSA reaches $100m in annual research expenditures it will have a shortfall of 125,410sf. This additional space would have to be built or leased.

It is imperative that the IT infrastructure at UTSA is kept up-to-date to support research. Such infrastructure includes state-of-the-art computing and storage hardware and high-speed internet connectivity at the appropriate sites on campus. As a means to improve the IT Infrastructure at UTSA, Research Computing should consider the adoption of BYOD (bring your own device) and cloud strategies as much as possible. The BYOD strategy will allow our researchers to acquire their own computing resources and either bring them on campus or access them through the Internet, or the combination of both. The “cloud bursting” feature of a hybrid cloud will allow us to quickly expand the capacity of our private cloud by tapping into the resources (processing, memory, storage) offered by the public cloud. Infrastructure and human capital may need to be diverted to ensure data integrity and security on the devices rather than the provisioning of devices for personal computing. The key advantage of a BYOD approach is that researchers will be able to buy devices that work for their purposes and their level of comfort, rather than being forced into a device standard. The comfort level with their device of choice may help increase productivity.

Another critical aspect to a university’s research infrastructure are core laboratories, which provide a centralized location for equipment and services that can be shared by all researchers at an institution. To build, modernize, and sustain core research facilities at UTSA, additional investment should also be considered in order to meet the demands of tier one research-intensive faculty. High-end instrumentation should be cataloged and made available to a broader base of users, including collaborators from partner institutions such as HSC, SwRI and Texas Biomed, through core facilities. Streamlining operational practices and strategically building core capabilities in collaboration with partners will allow for increased partnerships between the institutions. With increased access to equipment and user capacity, the university should consider technical and procedural solutions to core research facilities that increase use, improve customer service, and allow for greater operational success. Through optimization of existing core resources and increased administrative oversight, UTSA has the ability to improve cost recovery, while achieving increased compliance with federal and institutional regulations and overall increased productivity of associated researchers.

In order to ensure improvement of the administrative infrastructure supporting researchers at UTSA, leadership must continually evaluate all policies and procedures regarding research, holding as a priority the reduction of administrative burden from a faculty/researcher perspective, while maintaining a compliant research administration program. During this process, those responsible for evaluation should partner with faculty to develop and revise policies that affect research and invite faculty to beta-test new or revised procedures. By taking a proactive approach to help investigators understand their administrative responsibilities to facilitate research planning and performance, interactions with research administration will yield more successful outcomes. Electronic management systems should be implemented when reasonable, with careful attention paid to the benefits to investigators.
Other support provided by research administration should include advanced notifications, reminders, checklists, and guidance documents to help UTSA researchers make informed decisions about meeting administrative and compliance requirements. As UTSA leadership and faculty are committed to meeting compliance requirements in the most efficient manner possible, all involved take a proactive approach in forming and maintaining strong partnerships between research administration and UTSA departments and external entities to prevent researchers from having to negotiate between various units.

3.7 Increase the Impact of University Innovations

Universities are founded on the principle of imparting knowledge, and innovation is key to the development of new knowledge. The translation of this knowledge into useful products and services is paramount for the success of our economy and our society. Research into the effective translation of research into such products and services highlights the need for a campus-wide innovation ecosystem. This means through the actions of UTSA and the surrounding community, we establish the processes, tools, and support mechanisms to enable research ideas to be explored, tested, improved, and translated into innovations that impact our society.

Traditional research funding streams typically culminate with simulation or laboratory experimentation, and researchers publish their theories and findings. This work may lead to filing invention disclosures in anticipation of patenting innovations. However, the ability to demonstrate the value of a new innovation to a potential industry partner or technology licensee is greatly increased with the completion of a proof-of-principle project. This is a project that demonstrates one or several of the key findings from the research in a manner relevant to the potential application by a company in a new product or service. Completion of a proof-of-principle increases the probability of translating the innovation to industry via a technology license. Since proof-of-principle work is outside of the scope of most grants, the university should establish an internal proof-of-principle funding program aimed at helping researchers continue post-grant work on patentable innovations, which the Office of Commercialization and Innovation can more readily work to license to industry. One method to implement this pathway would be a permanent fund within the VPR that can be used to fund proof-of-principle work on technologies that have the highest potential of being licensed and generating returns for the university.

Successful research innovations often have a multi-disciplinary mix in the research team and require an even greater mix of skills in the team that translates the innovation to market. An analysis of the Association of University Technology Managers (AUTM) licensing data shows that the majority of technology transfer activities in the country that result in significant licensing revenue to the university are
in the biomedical and health related fields, and in many cases, the faculty innovators have made the first industry contact that will lead to a potential license. The university thus needs to infuse innovation and entrepreneurship thinking into students, faculty, and staff across university programs. Furthermore, a broader view of benefits to the university beyond innovation licensing revenue needs to be established to enable this evolution of the campus, including growing sponsored research, increasing long-term philanthropy, and promoting the hiring of university graduates by partner companies.

The creation of new innovation and intellectual property policies at the university must focus on the larger scale picture associated with these benefits. Early phase technologies typically require serious investment and effort to prove out market demand, an activity that is well beyond the role of the university. In these cases, university policy needs to promote an easy path to such technology transfer, helping to generate university spin-offs, translating technology to local companies, enabling industry-to-sponsors to pre-negotiate their licensing rates, and seeing our students graduate and move into industry.

In recent years, a concerted effort has been made by companies to partner with universities in early stage research and in educating students. Companies are also investing more heavily in technology scouts that are looking for university capabilities or innovations that may bolster the success of the company and/or specific products or services. Industry collaborations represent less than 1% of the sponsored research at UTSA, and should be driven towards a goal of 10% with novel partnerships and industry collaborations that benefit the university and industry.

3.8 Build Effective Communication

UTSA's largely decentralized structure allows for different and sometimes independent entities (Colleges, Departments, Centers, Institutes, etc.) to plan and create communication and marketing strategies that are tailored to their customer base, while fitting within available budgets. However, this organizational structure does create challenges for the timely sharing of information within UTSA and with non-UTSA entities. For improved communication related to research activities, the VPR must work closely with all UTSA entities and external partners, increasing its internal and external research visibility by implementing strategic communication and marketing plans. These plans will rely heavily on improving the flow of internal communication within the various UTSA entities, as well as establishing direct lines of communication with UTSA partners such as SwRI, HSC, and federal agencies that support research at higher-education institutions.

Another critical component to UTSA's future success is the visibility of the UTSA research enterprise within federal funding agencies. This will require significant attention to building and maintaining promotional materials on UTSA's Areas of Research Excellence. UTSA leadership and faculty must work to strengthen communication with decision makers at the federal level, through regular contact, and when advantageous, through regular visits to agency headquarters, branch offices and national conferences. Knowledge gained must then be further distributed back to other stakeholders at UTSA following all interactions.

4. Areas of Research Excellence

Through careful deliberation, five Areas of Research Excellence at UTSA have been identified for consideration of strategic hiring over the next 4-5 years. Strategic hiring in these areas should be above and beyond normal hiring patterns that fulfill teaching needs and replacement faculty. These themes are supported by significant input provided by faculty committees assembled to identify areas of excellence documented by critical faculty mass, funding portfolios, publication and citation histories and strategic partnerships at the regional and national level. The support and growth of these areas will depend on efforts by the University administration, college deans and department chairs, but most importantly by the campus faculty with interests in these areas.

4.1 Advanced Materials

Modern society is highly dependent on advanced materials for applications ranging from telecommunications to biomedicine. Researchers investigating advanced materials examine the relationship between the structure, function, and properties of material. Materials science at UTSA is an interdisciplinary area, spanning chemistry, physics, engineering, and biomedical sciences. Scientists at UTSA are exploring novel ways to mold molecular structures in
order to create safer and more efficient materials. UTSA is host to advanced visualization instrumentation such as the Helenita microscope, which captures images at near theoretical limits at 0.72 picometers of resolution. Thus, at UTSA, researchers are observing the building blocks of matter at their atomic level. Research at UTSA covers the essential fields within Materials Science ranging from Nanoelectronics to Biomaterials. Current areas of research include: Nanoparticles, Electronic and Optoelectronics, Photonics, Plasmonics, Polymeric, Metallic, and Constructional Materials.

4.2 Cloud, Cyber, Computing and Analytics (C3A)

As advancements in cloud computing expand use of this technology, concerns of associated risks increase as more institutions and individuals migrate their computing functions to the cloud. Further development of the cloud will allow for increased capturing of big data in almost every aspect of society. As a result, the need for data security and analytics is of highest priority for industry, government, and academia. Cloud, cyber, computing, and analytics have become pillars within UTSA’s research portfolio. In spring 2014, UTSA was named #1 nationally for Cyber Security Programs according to a national survey of certified information technology security professionals conducted for Hewlett-Packard. To further grow these research areas, UTSA has constructed a brand new, state-of-the-art facility that will dedicate nearly 28,000sf of space to merge research expertise, joint resources, and equipment in an effort to enhance this portfolio at UTSA, while increasing interdisciplinary collaborations.

UTSA is home to the Institute for Cyber Security (ICS), whose researchers bring exceptional expertise in cyber security models, architectures, protocols and technologies, and world-class laboratories. The Center for Infrastructure Assurance and Security (CIAS), also located at UTSA, has developed the world’s foremost center for multidisciplinary education and development of operational capabilities in the areas of infrastructure assurance and security. In complement to the ICS and CIAS, the Center for Education and Research in Information and Infrastructure Security (CERIPS) conducts high impact research in information assurance and security, as well as educates the cyber security workforce within the San Antonio area and beyond.

In partnership with industry leaders, UTSA has rapidly established the largest open cloud infrastructure in academia. By first having built a solid foundation in cyber security and then in cloud computing, UTSA has the capability to handle and process large amounts of data in a secure fashion and is now poised to launch into big data analytics, which will be the final component of UTSA’s research strength in C3A. Research in data analytics will create paradigms to identify trends and best practices and can bring enormous value to fields such as healthcare, engineering, and finance.
4.3 Integrative Biomedicine

Integrative biomedicine covers three areas within research at UTSA—Human Immunology and Infectious Disease, Neuroscience, and Regenerative and Molecular Medicine. Professors across numerous disciplines work in these fields, with many of them conducting research in all three areas simultaneously. NIH spends more than 80% of its approximately $30.1 billion annual budget through nearly 50,000 extramural, competitive grants to researchers. To continue capturing portions of these funds, UTSA has gathered together some of the best researchers in the world in the aforementioned areas. In efforts to combat the growing biomedical problems plaguing the world, UTSA has joined with leaders in industry and academic institutions—including the University of Texas Health Science Center at San Antonio, San Antonio Military Medical Center, Department of Defense, and numerous other public and private partners. UTSA has already proven itself a beacon for Integrative Biomedicine research and will continue to advance research in this field for years to come.

4.3.a Human Immunology & Infectious Diseases

Throughout history, infectious diseases have touched on all aspects of human existence and quality of life. As a consequence of the advances (identification of most infectious disease agents, vaccines, antimicrobials, water purification, sewage treatment, and other methods to control spread of pathogens, etc.) in the first golden age of microbiology, there has been a rapid increase in life expectancy at birth, reductions in infant and child mortality, and for about the last 50 years, reductions in deaths of the elderly. UTSA's researchers at the South Texas Center for Emerging Infectious Diseases (STCEID) include established investigators in cutting-edge research areas in human immunology and infectious diseases. Over the years, the STCEID has built a national reputation in the fields of molecular microbiology, immunology, medical mycology, virology, microbial genomics, vaccine development, and biodefense-related pathogens. The STCEID and UTSA have developed state-of-the-art facilities which include high-level biological containment, extensive infectious disease animal modeling, high throughput drug and genomic screening, and immunological profiling, all of which are aimed at translating basic discovery into the development of new diagnostics and therapeutic approaches for humans.

4.3.b Neurosciences

The brain is the organ of human thought, perception, and action. The science of neurobiology provides valuable insights into the molecular, cellular, and system level of the brain. Understanding how the brain processes information and gives rise to human experience is one of the greatest scientific challenges faced by mankind. In April 2013, a new, $100 million Presidential focus was launched by the US, aimed at revolutionizing our understanding of the human brain (www.whitehouse.gov/share/brain-initiative). The initiative breaks with the history of NIH Neuroscience funding by emphasizing research tool-making rather than basic discovery or translation. This reflects the excitement in the field about several new technical breakthroughs in experimental techniques that may also have important practical applications. Through the Neurosciences Institute and its partnering academic departments, UTSA has established core research excellence in the study of the biological basis of human experience and behavior, and the origin and treatment of nervous system diseases. Specific areas of research include, neural and network computation, neurodegeneration, cellular mechanisms of synaptic plasticity, neuroendocrine systems, and the neural basis of communication.

4.3.c Regenerative and Molecular Medicine

Modern medicine faces increasing challenges as greater portions of populations reach old age, to the extent that healthcare needs will soon exceed available resources. In addition, many debilitating diseases, conditions, and injuries or wounds remain refractory to current therapeutic approaches. Stem cells, tissue engineering, innovative drug design, and regenerative medicine offer novel, paradigm-shifting solutions to the treatment of otherwise intractable conditions. Biologists at UTSA in the PriSteM Center are engaged in developing stem cell-based therapies using clinically relevant nonhuman primate models for preclinical testing to ready new approaches for use in human patients in the clinic. UTSA chemists in the Center for Innovative Drug Design are using high throughput approaches to screen chemical and natural compounds to discover novel molecules that can be used to treat devastating human diseases. Biomedical engineers at UTSA are developing new synthetic materials and approaches to facilitate tissue engineering, drug delivery, and restoration of organ function. Together, these centers are changing the face of modern biomedical research by exploiting key strategies from biology, chemistry and engineering to develop new therapeutic approaches that are more effective,
efficient, and safe than those currently in use. These therapies hold the potential to allow our healthcare system to keep pace with the ever increasing demands of expanding and aging populations.

4.4 Social and Educational Transformation

UTSA is uniquely positioned in south Texas to better understand and address issues related to socioeconomic and health differences and challenges. A significant element of this strategic position is the number and percentage of persons who are of Hispanic descent in the area and the proximity of the US-Mexico border region. UTSA sits centrally positioned to be a leader in research, teaching, and service to address overarching themes in immigration, border and refugee issues, global impacts, poverty, inequality, upward mobility, and educational attainment, and health issues. Also of interest to UTSA faculty are areas such as the social and behavioral aspects of health and wellness, health disparities, and multicultural and multilingual communication. Researchers within a variety of colleges and the Institute for Economic Development, Mexico Center, Institute for Health Disparities Research and the Institute for Demographic and Socioeconomic Research at UTSA work closely with one another to create solutions that advance business, community, and economic development for regional and global partners.

4.5 Sustainable Communities and Critical Infrastructure

One of the greatest challenges that we face in the U.S. is how to form and shape our cities and regions. Two-thirds or more of the world population will live in cities by 2050. At UTSA, interdisciplinary teams built of urban planners, engineers, demographers, and social and public policy researchers carry the necessary expertise and capabilities needed to find solutions to the problems that lie ahead. Research capabilities addressing sustainable communities/regions and critical infrastructure reside across several colleges and institutes at UTSA, including the College of Architecture, College of Business, College of Engineering, College of Liberal and Fine Arts, College of Sciences, and the College of Public Policy.

Communities worldwide are facing shortages of energy and water. UTSA is uniquely positioned to provide leadership in these areas because of its geographical location. In areas south of San Antonio, the Eagle Ford Shale contains one of the largest oil and gas reservoirs in the country. Additionally Texas is home to some of the largest solar and wind power generation facilities in the nation. A chronic shortage of water in south Texas has communities, industry and agriculture all competing for the same resources. UTSA researchers address these issues through its Texas Sustainable Energy Research Institute, the Water Institute of Texas, and the Institute for Economic Development. Each of the above colleges and institutes is dedicated to creating practical and sustainable infrastructure to support a growing global population.
5. Implementation Approach and Strategic Recommendations

Based on the information discussed previously and input from a representative cross-section of university faculty and leadership (see Appendix A), strategic recommendations are presented below as a guide to how UTSA can become a nationally recognized research university with global impact. The ability to execute the formal strategy will be highly dependent on the university’s administration, college deans and department chairs, as well as support from the faculty body. As a means of providing a clear execution strategy that is in alignment with the overarching plan, a precise implementation matrix will be created to define specific tactics, assign responsible parties, and to establish timelines and the required fiscal and material resources. Upon approval of Accelerate 2025: UTSA’s Framework for Top Tier Research by university leadership, the Office of the Vice President for Research will begin development of the implementation plan in consultation with college and departmental leadership who will play a vital role in the successful execution of the below recommendations.

**Pathway 1 - Invest in Faculty to Increase Funded Research**

a. Support early-career faculty in building a strong research foundation and encourage mid-career and senior faculty to focus on vitalizing their research effort.

b. Expand professional development activities that inform researchers on federal funding agency missions, structures, funding mechanisms and the ways in which to engage and successfully secure research collaborations and subsequent funding.

c. Provide opportunities for researchers from across campus to get to know one another’s research programs (faculty mixers, interdepartmental lectures, etc.) and expand this model to encompass external research partners (e.g., HSC, SwRI and Texas Biomed).

d. Increase staffing support to facilitate multi- and interdisciplinary research teams in pursuit of large, highly focused extramural funding opportunities and stimulate multi- and interdisciplinary research through seed funding provided by VPR and the Colleges.

e. Enhance UTSA's searchable database of faculty expertise and expand knowledge of the product internally to faculty and externally to partners such as HSC, SwRI, and Texas Biomed.

f. Build the relevant support infrastructure and expand access to proposal development support (writing, editing, compiling required materials and mock peer review) and enhance visibility of funding opportunities through direct communication to faculty and expanded use of web-based tools.

g. Increase the number of Career Award applications and awardees, through targeted support in proposal development, revision and resubmission for promising faculty within their three years at UTSA.

h. Facilitate and standardize course buy-out processes to afford faculty time to complete funded research obligations.

**Pathway 2 - Capitalize and Promote Areas of Research Excellence**

a. Brand and promote Areas of Research Excellence that carry the potential to leverage significant extramural funding opportunities.

b. Rapidly hire new faculty with well-established research programs and associated extramural funding in the areas of excellence listed above. This cluster hiring should potentially include members of national academies, and should be in addition to the normal annual hiring patterns at UTSA. Special committees with senior administration and subject experts both internal and external to UTSA should be used to augment the normal hiring procedures.

c. Increase the number of Endowed Chairs and Professorships available for faculty at UTSA. Endowment returns should be utilized towards offsetting academic salaries such that salary savings can be used towards new faculty hires.

d. Link new faculty hires to Research Centers and Institutes to create synergy among research collaborations and the submission of joint proposals.

e. Support emerging Areas of Excellence through internal F&A funded programs such as institutional seed grants, travel grants, and graduate student support.

**Pathway 3 - Reward Scholarly Excellence**

a. Establish effective and diverse tools for merit evaluation, including acknowledgment of all grants and contracts, number and amount of major grant awards, emphasis on prestigious, competitive research funding, publications, peer-reviewed books and articles, etc.

b. Implement a shared-credit process for recognition of each college and faculty member’s efforts per project.

c. Provide recognition of scholarly excellence through formal acknowledgments of faculty contributions, including the creation of research achievement awards.
d. Increase visibility and recognition of faculty for scholarly excellence in UTSA publications and at UTSA-sponsored events.

e. Create financial incentives for scholarly excellence through UTSA awards granted to or named in honor of faculty, funding to support professional travel, funding for graduate students, and funding for outreach or other professionally enriching activities.

f. Establish an Academy of Distinguished Research Scholars to reward research excellence and develop best practices.

Pathway 4 - Enhance Undergraduate and Graduate Research

a. Highlight undergraduate participation in research through the UTSA Undergraduate Research Showcase.

b. Enable access to undergraduate research by expanding the number of funded undergraduate research opportunities.

c. Expand the clearing house of information about UTSA undergraduate research programs and resources available for research training through the Office of Undergraduate Research.

d. Recruit top Masters students through expedited admission processes.

e. Increase the number of graduate students, especially at Masters level, while increasing quality.

f. Focus retention efforts to enhance graduate student graduation rates

g. Encourage and support training grants to support and grow graduate student enrollment.

h. Provide additional financial support, such as paying for tuition and fees expenses for PhD students, to foster excellence in research and post-graduation.

Pathway 5 - Strengthen and Expand Research Partnerships

a. Expand partnerships with HSC, SwRI, Texas Biomed, and San Antonio Military Medical Center to further increase the profile of San Antonio as an internationally known research community.

b. Leverage partnership resources and expertise in joint research collaborations and utilize these relationships in pursuit of large scale, federal funding opportunities.

c. Expand and create more impactful partnerships with federal agencies by advising researchers on the types of federal agencies that offer research opportunities to universities and the means by which to pursue research partnerships and funding.

d. Identify and pursue more opportunities that are directly focused towards funding Minority Serving Institutions (MSI's)/Hispanic Serving Institutions (HSI's) and consider partnering with other UT System MSI's/HSI's for greater capability and proposal impact.

e. Assess the current Technology Readiness Level (TRL) of the different areas to allow leadership and researchers to understand where they will be competitive for federal funding, in specific with agencies such as the Department of Defense (DoD), Department of Homeland Security (DHS) and in many cases private-sector industries linked to the federal government.

f. Expand the federal funding portfolio through non-traditional partnerships under mechanisms such as Cooperative Research and Development Agreements (CRADA), Consortium Membership and Software Agreements that have the potential to increase research expenditure growth.

g. Pursue additional linkages with federal laboratories through promotion of Federal Laboratory research funding opportunities to both faculty and student researchers.

h. Build upon and leverage existing relationships through IED partners (Small Business Development Centers, US Agency for International Development, the Organization of American States, and the U.S. Department of State) to create deep, lasting ties with strategically targeted foreign institutions and funders.

i. Leverage and strengthen interwoven activities regarding Eagle Ford Shale to bolster the capacity, relevance, and impact in the region.

Pathway 6 - Enhance Research Infrastructure

a. Optimize and enhance current research space to reach an average research space productivity of $212/sf in the short term, $238/sf in mid-term, and $300/sf in the long term.

b. Expand power and network connections (both to the Internet & Internet2 and on-campus wired & wireless networks) and increase the infrastructure for BYOD (bring your own device).
c. Add resources to improve access to supercomputers and cloud-based computing software so that current research at UTSA can proceed more efficiently.

d. Catalog and promote high-end research instrumentation to a broader base of users, including collaborators from partner institutions.

e. Streamline core research facility operational practices and strategically building core capabilities in collaboration with partner institutions.

f. Provide additional administrative guidance and support to core research facilities to ensure that acceptable federal cost accounting practices are followed and to improve cost recovery from operations.

g. Follow the models of UT-EI Paso and UT- Austin, and consolidate pre-and post grant accounting under one unit to improve efficiencies.

h. Reassess distribution of F&A funds using models at peer institutions in Texas.

i. Optimize research-related policies/procedures to minimize administrative burden on the researcher while maintaining required compliance and not expanding administrative costs.

Pathway 7 - Increase the Impact of University Innovations

a. Build a campus-wide innovation ecosystem.

b. Provide gap funding to enable researchers to successfully complete proof of principle/proof of innovation.

c. Encourage faculty to engage with industry, entrepreneurs, and venture partners in translating research into new products and services. Develop policies and processes to enable these activities.

d. Create and grow cross-disciplinary programs that encourage students to pursue careers as innovators and entrepreneurs.

e. Establish policies to encourage technology transfer that maximize overall benefits (e.g., research funding, national profile, etc.) to the university and not just licensing revenues.

f. Facilitate university industry collaborations by expanding public/private partnerships including programs that promote sharing of facilities, and other resources.

g. Consider the use of public-private partnerships to build shared facilities on UTSA campuses.

Pathway 8 - Build Effective Communication

a. Increase internal and external research visibility by implementing strategic communication and marketing plans, led by the VPR.

b. Improve the flow of internal communication within the various UTSA entities.

c. Establish direct lines of communication with UTSA partners such as the SwRI, HSC, and national federal agencies that support research at institutions of higher-education.

d. Increase visibility of the UTSA research enterprise within federal funding agencies through creation and distribution of promotional materials focused on UTSA's areas of research strength.

e. Strengthen communication with decision makers at the federal level, through regular contact and when advantageous, through regular visits to agency headquarters, branch offices, and national conferences.

f. Transfer knowledge gained from communication efforts at the federal level back to university leadership.
Appendix A: Roster of Faculty and Staff Engagement for Accelerate 2025

Amar Bhalla, COE
Amaury Nora, COEHD
Bernard Arulanandam, Research
Beth Manning, Research
Betty Merchant, COEHD
Can Saygin, Research
Carlos Garcia, COS
Charlie Wilson, COS
Cory Hallam, Research
Dan Gelo, COLFA
Daniel Pack, COE
Donovan Fogt, Research
Doug Frantz, COS
Drew Johnson, COE
F. Frank Chen, COE
Floyd Wormley, COS
Francine Romero, COPP
George Perry, COS
Gerry Sanders, COB
Glenn Dietrich, COB
Gloria Crisp, COEHD
Greg White, COS
Hamid Beladi, COB
Harriett Romo, COLFA
Harry Millwater, COE
Hazem Rashed Ali, COA
Heather Shipley, COE
Jaclyn Shaw, Research
Jennifer Sisane, Research
John Foster, COE
John McCarrey, COS
John Murphy, COA
Joo Ong, COE
Jose Lopez-Ribot, COS
Juan Gomez, COE
Karl Klose, COS
Krisellen Maloney, Libraries
Laura Rendon, COEHD
Les Shephard, COE
Lloyd Potter, COPP
Mehdi Shadaram, COE
Michelle Atchison, UT System
Michelle Stevenson, Research
Miguel Yacaman, COS
Misty Sailors, COEHD
Neal Guentzel, COS
Nicole Beebe, COB
Page Smith, Graduate School
Raj Boppana, COS
Ravi Sandu, COS
Rebekah Smith, COLFA
Richard Diem, Honor’s College
Richard Tangum, COA
Robert McKinley, IED
Rogelio Saenz, COPP
Ruyan Guo, COE
Sonia Martinez, President’s Office
Sunay Palsole, OIT
Tim Luukkonen, Research
Thankam Sunil, COLFA
Thomas Forshuber, COS
Thomas Tunstall, IED
Tony Cicchetti, COB
Waldemar Gorski, COS
William Cooke, COEHD
Yoris Au, COB

Appendix B: Cluster Hiring Examples


