

STRATEGIC PLAN FOR RESEARCH

A Ten Year Plan Towards Becoming A
National Research University

2011 - 2020

Submitted to the Texas Higher Education Coordinating Board

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Strategic Plan for Research University of North Texas

EXECUTIVE SUMMARY

During its 120-year history, the University of North Texas has progressed from a private normal college to a large, comprehensive public research university with 12 colleges and schools, nearly 50 doctoral degree programs, and a combined annual budget in excess of \$750 million. UNT is the flagship of the University of North Texas System and the largest university in the Dallas-Fort Worth region. With more than 36,000 students, it also is the fourth largest university in Texas. It is ranked by the Carnegie Foundation as a *Research University in the High Research Activity Category*.

UNT faculty produce groundbreaking research in a wide range of disciplines within the sciences and engineering, and make nationally recognized contributions in the arts and humanities. The College of Music is internationally famous, and its jazz studies program was the first of its kind in the nation and among the world's best. UNT has the oldest program in emergency and disaster management and a unique program in applied philosophy and environmental ethics. UNT also is home to many national centers and institutes, including the Net-Centric Software and Systems Center — an NSF Industry/University Cooperative Research Center; the Semiconductor Research Corporation, Center for Electronic Materials Processing and Integration; the Institute of Applied Science; the Center for Advanced Scientific Computing and Modeling; the Texas Center for Digital Knowledge; and the Center for the Study of Interdisciplinarity. UNT has developed many state-of-the-art research facilities, such as the Center for Advanced Research and Technology (CART), one of the nation's most extensive facilities for powerful materials characterization and analysis; a high-performance computational facility; and a clean room/nanofabrication research facility (under construction). UNT's research extends outside the academy as well, with field stations as close as a neighboring lake and as far away as southern Chile.

In addition, UNT is developing a research park (UNT Discovery Park) with technology incubator facilities on a 290-acre property near the main campus. The university is well integrated into the fabric of the city of Denton. UNT offers classes in downtown Dallas, just 35 miles away, and is developing a Design Research Center in the heart of the Dallas design district. The university boosts the Dallas-Fort Worth economy by more than \$1.3 billion each year, and UNT alumni impact the area's economy by more than \$10 billion annually.

UNT, one of the seven emerging research universities in the state of Texas, is greatly energized by the opportunities created by House Bill 51, passed by the Texas State Legislature in 2009. The bill challenges UNT and others to be highly competitive and become *national research universities*. In response to the Texas Higher Education Coordinating Board requirement that each emerging research university develop its own long-term strategic plan for achieving recognition as a national research university, UNT leaders have engaged in extensive deliberations to create a strategic plan to realize UNT's vision of becoming a national research university. The university aspires to move to the Carnegie *Very High Research Activity* category. Already a comprehensive university, UNT would then be in the company of 90 percent of Carnegie *Very High Research Activity* and AAU member universities that are *comprehensive* and have strengths in many diverse areas.

The strategic plan for research presented here is a 10-year, two-step plan that addresses each of the seven areas in the THECB's guidelines. The first step is to meet the eligibility requirements for the National

Research University Fund by 2015, and then to move forward in the second phase to reach the Carnegie *Very High Research Activity* university category. The key features of the plan are summarized below.

Expand External Research Funding: UNT has created a plan for investment in strategic priority areas that are most suited to its research expertise and infrastructure; its current and prospective partnerships with regional, national and international institutions and industry; its aspirations to be a major player in the economic development of the region and the state; and its vision of higher education for the 21st century. It is an ambitious and bold plan that centers on hiring more than 200 research-active faculty in the selected areas by 2020 whose external funding can contribute substantially to THECB restricted research expenditures. More than 150 of these new faculty (more than 50 percent at the senior level) would be hired by 2016, and an additional 50 by 2020. These new faculty, well supported through their start-up packages and coupled with the expanded research activities of existing faculty, will enable UNT to reach external funding goals of:

- \$45 million in THECB restricted research expenditures by 2015
- \$90 million in THECB restricted research expenditures and \$125 million in NSF-reported research expenditures by 2020. At that time, the external grants and contracts will be approximately \$150 million.

Improve Undergraduate Education: UNT will continue to build on its excellent reputation for high-quality undergraduate education and will further improve undergraduate education by improving curricula, by improving and expanding student services, and by attracting the best possible high school students to UNT as freshmen through targeted recruiting and merit scholarships. UNT will also continue contributing to *Closing the Gaps* by recruiting and graduating a diverse student body.

Expand and Improve Doctoral Training: Based on the results of a comprehensive study of existing doctoral programs, UNT will sustain the productivity of current high-quality programs through the allocation of additional resources, enhance the quality and productivity of programs through outcome-based investments, establish new doctoral programs in targeted areas, and reallocate resources from low-producing programs not aligned with UNT's strategic objectives. UNT also will increase its pool of doctoral applicants, improve retention, and increase selective admissions. The goals are to:

- Award 200 Ph.D.s annually by 2015
- Award 300 doctoral degrees annually (90 percent Ph.D. degrees) by 2020

Enhance Faculty and Student Development: UNT will focus on retention and development of high-quality faculty members through a variety of supportive and professional development resources. Student development will be enhanced by additional scholarships, fellowships and assistantships for needy as well as meritorious students. UNT will continue its highly successful efforts to promote diversity in the student body. In addition, UNT will develop innovative ways to support faculty and students for national and international competitions, recognitions, awards, and prizes.

Expand Research Facilities and Resources: UNT plans to significantly increase research space to accommodate the projected growth in research activities through a combination of reallocation of space, renovation of vacated space and new construction (altogether, about 300,000 ft²). At least one new science and technology research building is planned in addition to facilities currently under construction. UNT will continue to expand and upgrade research facilities and build new laboratories, specifically in the areas of strategic priorities. UNT plans to significantly expand its library resources and aggressively

pursue membership in the Association of Research Libraries. The Office of Advancement will align its goals with those of this strategic plan to help meet ongoing needs and to build UNT's endowment.

Increase UNT's National Visibility: Implementing this strategic plan will result in new avenues for UNT to gain national visibility. UNT will continue to support and promote the accomplishments of current and future individual faculty members who achieve national and international prominence. UNT will actively develop, promote and expand its inventory of research facilities, centers and academic programs that are among the best in the U.S.

The vision is clear. UNT will build many nationally and internationally recognized programs across the spectrum of academic degrees, research accomplishments and creative endeavors. In 10 years, a very high proportion of UNT faculty will be engaged in research and creative endeavors, both in areas for which external funding is readily available and in the disciplines for which external funding may be minimal but the intellectual contributions and doctoral production still contribute mightily. The challenging work that lies ahead to achieve this vision is invigorating and exciting to UNT leadership, faculty, students and staff. By effectively implementing this strategic plan, the University of North Texas will be recognized as one of the leading comprehensive research universities in the nation, and one day will rise to the ranks of great universities of the world.

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UNT's STRATEGIC PLAN FOR RESEARCH

Becoming a National Research University

I. VISION STATEMENT

I.1. History and Introduction

Founded in 1890 as a teachers training institute, the University of North Texas remains a powerhouse of teacher preparation and has greatly influenced the direction of primary and secondary education throughout Texas. During its 120-year history, the university has grown into a student-centered emerging research university that has constantly expanded and broadened its programs to establish a strong legacy of excellence in music, the arts, and the humanities. Building upon its early prominence and these established strengths, UNT's early leaders also ensured the institution continued to move forward by offering graduate studies in 1935, not only in education but also in biology, chemistry, mathematics, economics and several other areas. At that same time, the university was planting the first seeds for growing into a leading comprehensive research university by hiring its first research faculty member, J.K.G. Silvey, who had a passion for water research and contracted with the city of Dallas to provide scientific advice about the purification of the city's water supply.

Throughout the years, UNT has led the nation in introducing programs such as jazz studies and emergency administration and planning, as well as the nation's first accredited counseling program and the first Ph.D. in art education. And by the 1960s, as UNT was achieving university status, several Ph.D. programs had developed in the sciences. These burgeoning programs further fostered graduate research and expanded the institution's prominence, leaving no doubt of UNT's status as a comprehensive university.

Offering a breadth of disciplines from visual arts to engineering in 12 schools and colleges, today's UNT prides itself on providing opportunities for students and providing solutions for real-world issues. As the fourth largest university in Texas, UNT is the choice of more than 36,000 students who enroll and find themselves immersed in UNT's 97 bachelor's, 101 master's and 49 doctoral degree programs, many of which are nationally recognized. The 7,700-plus students who graduate each year are armed with knowledge and experience as they join more than 326,000 UNT alumni who already are transforming the world.

UNT is committed to evolving to be in step with changing needs of its students, Texas, and the nation. Backed by a growing number of peer recognitions, UNT is seeking to take its place among the nation's premier universities. In fall 2009, *U.S. News & World Report* named UNT as one of the top national universities that is "leading the pack" in innovative changes, making it the only Texas public university on the list. In recent years, the university has made strategic investments in faculty, programs and infrastructure to move ever closer to its goal of becoming a national research university while growing its legacy in the arts, education and music.

I.2. Vision

The University of North Texas will be recognized as one of the leading comprehensive research universities in the nation.

As one of Texas' seven emerging research universities, UNT stands poised to take another defining step: becoming a top national research university. To achieve this long-held vision, UNT is building on its strengths as a comprehensive institution with global reach and is investing resources in its faculty, graduate students, academic programs, and research facilities. UNT has made dramatic gains toward its goal in just the last few years and continues to remain strong in its long-held areas of excellence. The university consistently awards nearly 200 new doctoral degrees annually, and this fall showed 11 percent increase in graduate students — with a 25 percent climb in engineering students alone.

The university is supporting a collaborative research cluster initiative that launched in fall 2008. With seven active research groups that explore the intersections of science, engineering, art and culture, UNT is capitalizing on its strength in collaboration. The research clusters also are helping to attract prominent faculty members and researchers to the vibrant, growing university. These newcomers join peers who are winning prestigious national honors such as Grammy nominations, National Science Foundation CAREER awards, and the Presidential Early Career Award for Scientists and Engineers.

Additionally, UNT's funded research expenditures and awards are each increasing steadily. Already an institution where research and scholarship flourish, UNT has invested significantly in new and upgraded research facilities, including a new high performance computing facility that is among the premier facilities of its kind. Discovery Park — a nearly 290-acre research park — marries science and technology with entrepreneurship and is home to a technology incubator, the federally funded Center for Advanced Research and Technology, the College of Information, and the College of Engineering which began in 2003. UNT already provides significant financial benefits to the region by boosting the Dallas-Fort Worth economy by more than \$1.3 billion each year, while its alumni boost the area's economy by more than \$10 billion each year.

Through its vision and strategic planning, UNT is becoming known as much for science and engineering as for its excellence in music, the arts, and education. UNT's world-renowned music faculty members are joined in national prominence by computational chemists, environmental scientists, philosophers, and materials scientists. And UNT continues to excel in educating and graduating students, now ranking first in the state for the increased number of degrees awarded and third for enrollment growth. UNT also proudly has earned three Texas Higher Education Star Awards for its commitment to *Closing the Gaps* and providing the talented students of Texas access to a top-quality education.

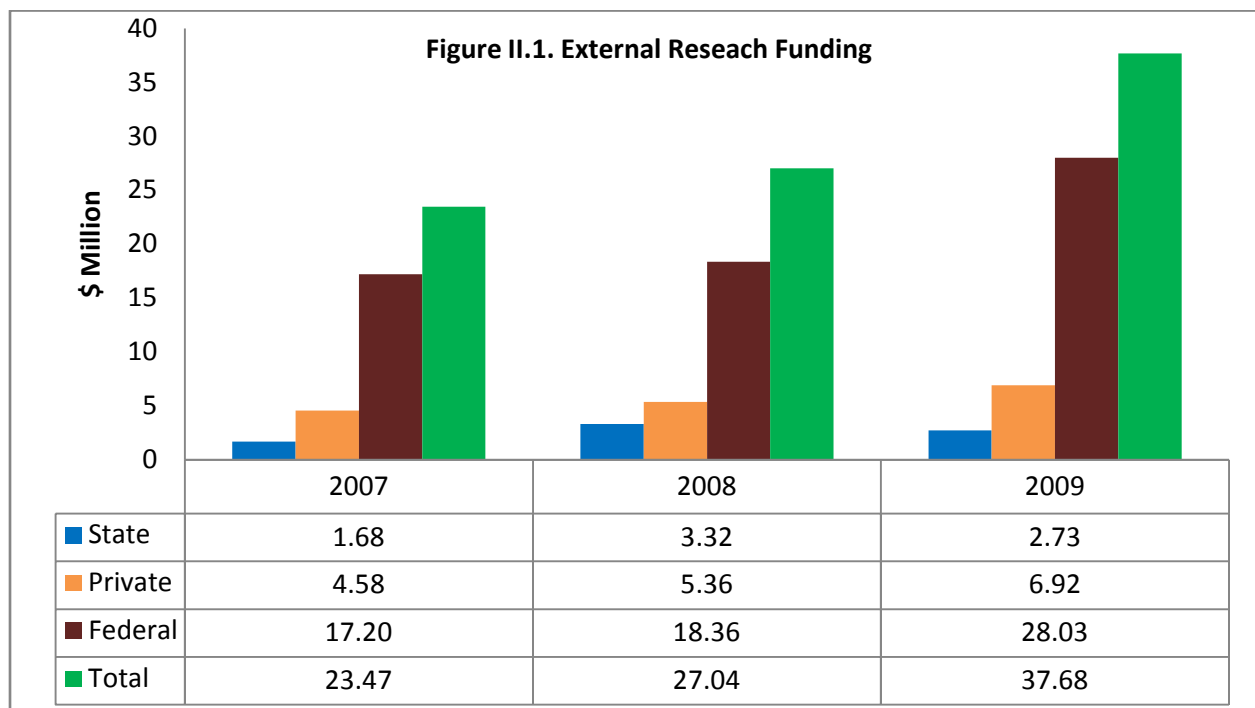
As UNT charts its course for the future, the university's ultimate priority will be to advance the state and nation by discovering new knowledge and educating students who transform the world as leaders, doers and thinkers. As a national research university, UNT will partner with other leading higher education institutions in Texas, the United States, and globally on collaborative research initiatives that advance science and technology — blazing new frontiers and cultivating the next generation of researchers, scholars, entrepreneurs and leaders of the global community. This plan presented here is dynamic and is sure to evolve over time. It outlines a set of bold and aggressive goals and initiatives to realize UNT's vision. Once implemented, UNT will reach levels of national and international recognition without parallel in the history of the institution.

II. PLAN TO INCREASE RESEARCH AND EXTERNAL FUNDING

The University of North Texas has been active in research and external funding for several decades. Historically, UNT faculty and graduate students have been extensively engaged in research. This is evidenced by high levels of research publications and doctoral graduates. However, a significant portion of this research has been conducted in areas that have not generated substantial amounts of external research funding (e.g., some subdisciplines within the social sciences and education). In recent years, research activities that secure external funding have taken on increased importance. With key academic leadership in place, the stage was set for the current rising trend in research funding, and the planned acceleration of funding outlined here. Infrastructure has been put in place to make high-level research possible, policies have been reviewed and revised to enable the kind of hiring and faculty reward systems needed to advance, and personnel have been put in place to facilitate proposal development and coordination of large-scale collaborations. In addition to collaborating with other institutions in the state and U.S., UNT will also advance globally via international collaborations. Thus, UNT is ready to accelerate the progress made in recent years with a systematic plan to increase research and external funding to meet qualifications for the state’s National Research University Fund (NRUF) by 2016 with \$45 million in restricted research expenditures for two consecutive years, and then to achieve funding levels consistent with being a national research university status by 2020.

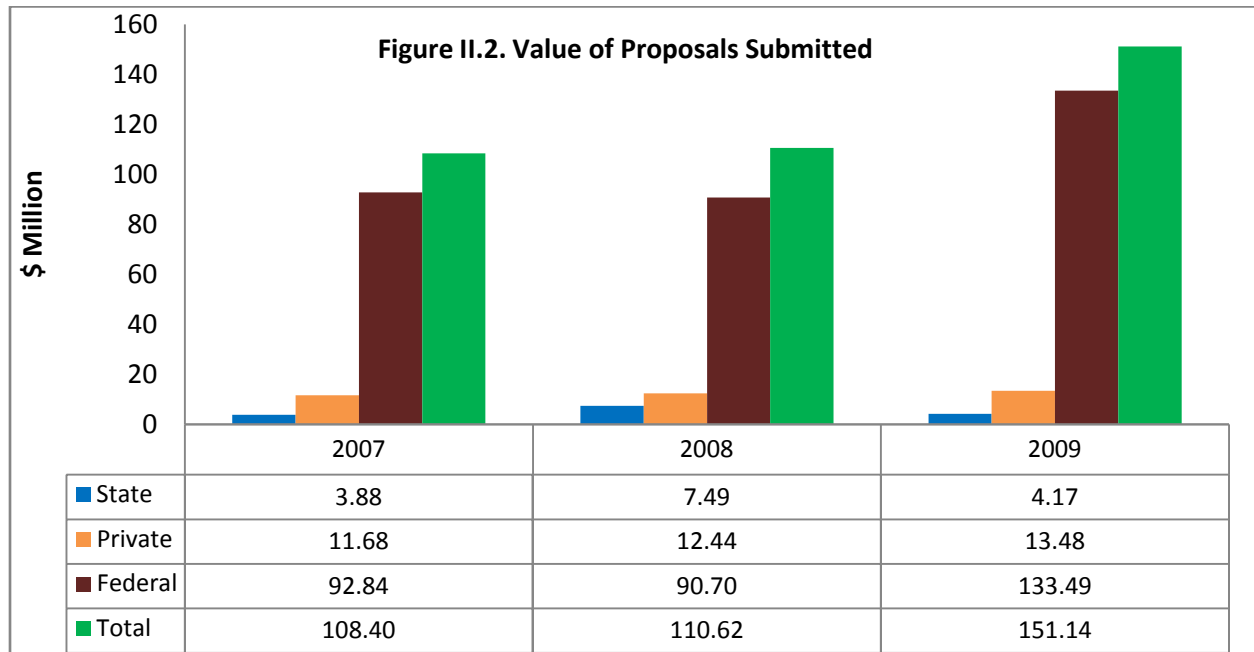
II.1. External Funding

The University of North Texas received external funding awards in excess of \$37.6 million in FY 2009, of which \$28.03 million derived from federal sources (see Figure II.1). This is a substantial increase over the awards that were received when current university leadership was recruited in 2006 and thereafter. The overall level of awards in FY 2009¹ represented a 60.6 percent increase over FY 2007.

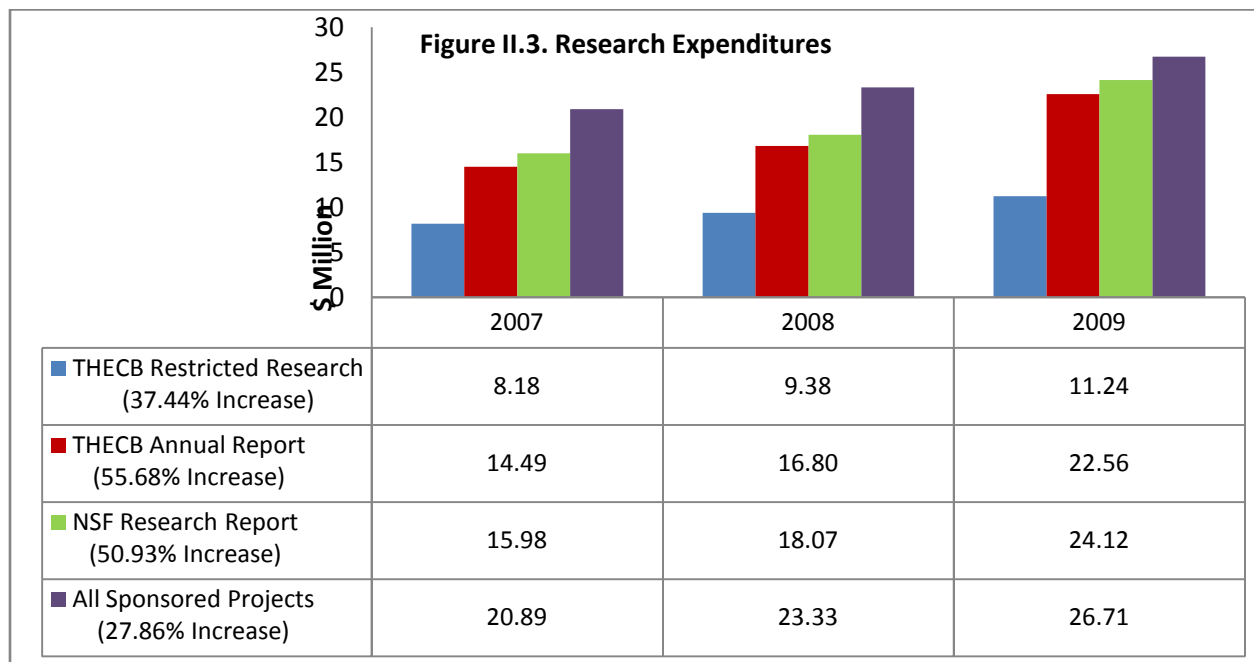


¹ Note that unless otherwise specified, all references to years in this strategic plan are fiscal years, defined as September 1 of the preceding year through August 31.

To fully understand the pattern of awards and to facilitate projection into subsequent fiscal years, it is important to ascertain whether or not there has been a steady rise in the dollar value of all proposals submitted over the same period of time (see Figure II.2).



Expenditure levels naturally lag behind awards. Most research grant awards are expended over a two to three year period, with some even occurring over a five-year period. Thus, the awards obtained during a given three-year period give a general indication of the expenditure levels several years later. Figure II.3 shows UNT's research expenditures from 2007 through 2009.



In FY 2009, total expenditures associated with sponsored project awards were \$26.71 million. Research expenditures as calculated for the National Science Foundation (NSF) Research Report were \$24.12 million, whereas the restricted research expenditures as per the Texas Higher Education Coordinating Board (THECB) Accountability System were \$11.24 million. Given that the awards obtained during this same window of time steadily increased (Figure II.3 above), it is logical to conclude that expenditure levels in the next two to three fiscal years will show comparable upward trajectories.

II.1.a. Goals

The THECB restricted research expenditure calculation and the research expenditures as per the NSF are the primary indices for goal-setting and for pursuing qualification for the National Research University Fund, and ultimately national-level recognition as a major research university. Toward those ends, UNT has established the projections and targets shown in Table II.1. Also in Table II.1, each goal is compared to the average of the NSF expenditures reported by the THECB's designated aspirational peer universities in 2008 (the most recent year for which NSF expenditure data are available).

Table II.1.

Fiscal Year	Plan Year	THECB Expenditures	NSF Expenditures	% of Target Peers' NSF Average	% of Target Peers' NSF Minimum
2009 (actual)	-1	\$11.2M	\$24.1M	9%	19%
2010 (projected)	0	\$14M	\$26M	10%	21%
2011 (goal)	1	\$18M	\$30M	11%	24%
2015 (goal)	5	\$45M	\$75M	29%	60%
2020 (goal)	10	\$90M	\$125M	48%	100%

Note: The ratio between UNT's THECB and NSF expenditures is estimated; "% of Target Peers' Average" is the percentage that UNT's NSF expenditures comprise of the average 2008 NSF expenditures reported by the aspirational peer universities selected by the THECB (Arizona State University, Colorado State University, North Carolina State University, State University of New York at Albany, University of California at Santa Barbara, University of California at Santa Cruz, University of Connecticut, University of Delaware, University of Kansas, University of Maryland, University of Nebraska-Lincoln, Rutgers University), which was \$261 million; "% of Target Peers' NSF Minimum" is the percent that UNT's NSF expenditures comprise of the lowest 2008 NSF expenditure reported by an aspirational peer university, which was the University of Delaware at \$125 million.

Research expenditures are continuously monitored by the Office of Research and Economic Development (ORED) at UNT. Monthly, quarterly, and annual reports are then generated for local, state, and federal needs. Thus, UNT's progress toward these goals will be constantly in view of senior UNT leadership so that initiatives can be refined and adjusted accordingly.

The targets shown above were strategically chosen to allow UNT to meet the legislative threshold for accessing the NRUF by year five of the plan. With the momentum gained by the initiatives in place, and with the access to additional resources via the NRUF, UNT can then break through the \$125 million level of NSF-calculated research expenditures by year ten of the plan.

Having the faculty, programs, and infrastructure in place to meet the five-year and ten-year targets outlined above will provide the basis for continued growth and expansion of research productivity at the University of North Texas.

II.1.b. Current Trajectory Toward Goals

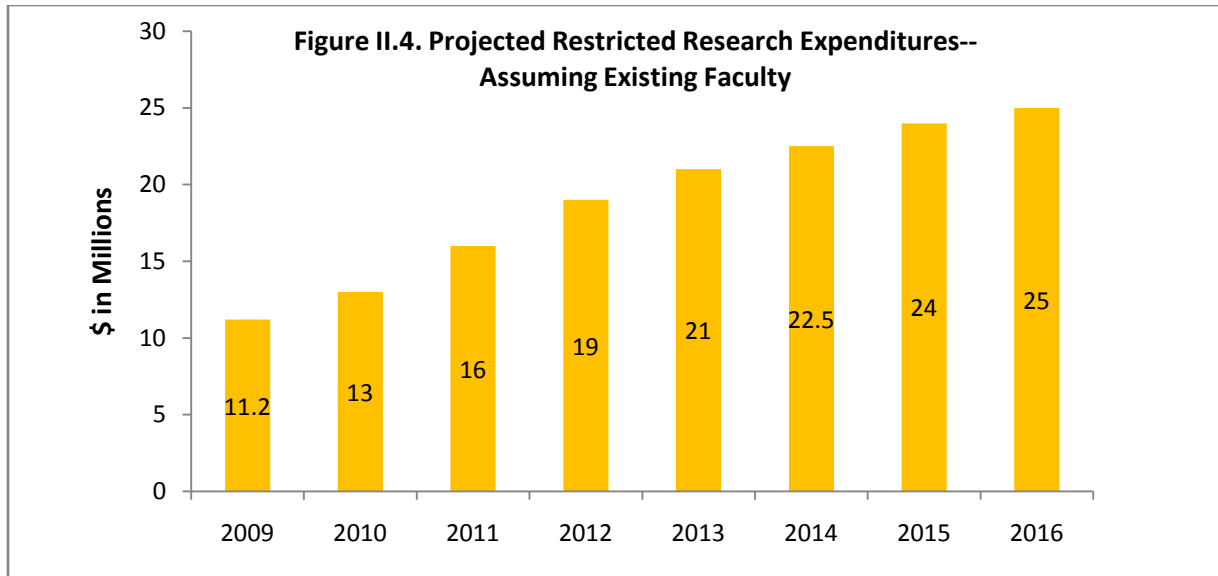
Given that the most immediate goal is the five-year target of exceeding \$45 million in restricted research expenditures, an analysis of the current upward trend in that index is critical. The substantial increases in awards and in the dollar amounts of proposals submitted are likely accounted for by three factors: (1) increased attention to these priorities by existing UNT faculty; (2) increased attention to funding capabilities in the recent years' faculty hiring; and (3) increased facilitation of fund-seeking. These will be considered separately.

Faculty at UNT are keenly attuned to the institution's priorities of increasing funded research. This is reflected by their increasing involvement in grant-seeking to support their scholarly research, and by the prioritization of research and funding productivity in the merit reviews as well as the promotion and tenure reviews carried out by faculty committees at the department/division and college levels.

Consistent with the rising premium that UNT faculty place on research funding, new tenure-track faculty hired into disciplines for which external research funding is common are increasingly active in their pursuit of research grants. As examples, among faculty hired into the College of Engineering in the past three years, fully 100 percent have submitted external research proposals. Likewise, of the faculty hired into STEM and social science disciplines within the College of Arts and Sciences during the same period of time, 73 percent have submitted proposals for external grants; this represents an upward trend for this group of disciplines given that it includes the social sciences—a trend we plan to accelerate in the coming years.

Finally, grant preparation assistance has been increased at UNT with the addition of a Research Development Team within the Office of Research and Economic Development. This team of professionals provides a wide range of services from identifying funding sources and conducting grant-writing workshops, to providing personalized proposal review and strategic fund-seeking assistance. Additionally, personnel expertise is being developed in several of the colleges to further facilitate the writing and processing of grant proposals by faculty.

A frank analysis of the impact of the above three factors suggests that the current faculty cohort will continue to increase UNT's restricted research expenditures in the coming years. However, the rate of increase shown in recent years is not likely to be sustainable due, in large part, to the functional ceiling effects inherent in factors #1 and 3 listed above. After consciousness among faculty is raised by the very public push of the institution to elevate its research profile, additional involvement in grant-seeking based simply upon that factor diminishes. Many faculty were either hired into disciplines for which substantial external funding is not available, or they were hired for skill-sets other than grant-writing and funded research. It is expected that the facilitation provided to current UNT research faculty will continue to increase the number of proposal submissions, the size (dollar amounts) of proposal submissions, and the hit-rate of grant proposals. However, growth rates exceeding 35 percent are not likely to be sustainable once the initial benefits of these services have been realized.



Thus, assuming no change in the faculty cohort at UNT, restricted research expenditures would be expected to increase in the coming years, but not to sufficient levels to meet the proposed targets. As can be readily observed in Figure II.4, this trajectory falls far short of the goal of exceeding \$45 million in restricted research expenditures by 2015. Thus it is apparent that a strategic shift in the faculty cohort via focused hiring must be undertaken for UNT to achieve its goals.

II.2. Research and Hiring Priorities to Achieve UNT’s Funding Goals

This is a long-term strategic plan, extending until UNT is recognized as a national research university. However, one important threshold benchmark along the way is to exceed \$45 million in annual restricted research expenditures for the two consecutive years prior to the 2017 biennium. The over-arching strategy UNT will employ to reach \$45M in restricted research expenditures will be to rapidly and strategically expand the faculty in targeted areas.

Within the first five years of this long-term plan, UNT plans to hire 153 research faculty who are among the best in their respective disciplines, and who also have the ability to make rapid and substantial contributions to the goal of generating restricted research funding. These will be faculty who can expand UNT’s external funding base primarily from its base that includes the National Science Foundation, U.S. Department of Education, and the State of Texas to obtain substantial research funding from federal agencies such as the Department of Defense, the Department of Energy, the Department of Agriculture, the National Institutes of Health, the Department of Health and Human Services, the National Aeronautical and Space Administration, the Environmental Protection Agency, as well as major corporations and leading charitable organizations in the arts and humanities. Thus, the majority of these new faculty will need to be senior faculty, with the junior faculty being targeted primarily to complement the cohort of senior faculty and/or to add expertise in cutting-edge fields in which senior talent is lacking nationally. Senior hires are critical to generate the needed funding in the very near term. The typical senior hire in a targeted area should begin generating \$500,000 to \$1 million in grant funding within the first two years at UNT; many will transfer ongoing grants to UNT at the time of hire. Junior faculty, although critical to the sustainability of institutional research expertise, usually require two to three years to begin generating external funds; and even then, it is often at more modest levels than would be secured

by senior researchers. Given the economic conditions of many public and private universities nationwide, the next five years represent a prime opportunity for UNT to attract top senior talent in targeted areas of research strength.

Benefits of Hiring Senior Research Faculty

- Increased research funding
- Increased doctoral production
- Mentoring of junior faculty
- Leadership for large team efforts such as center/institute proposals
- Interactions with industry
- Collaborations with other institutions nationally and internationally

II.2.a. Research Clusters

Even before House Bill 51 was passed and the THECB mandated submission of the current strategic plan, UNT began a process of selecting areas in which to build research programs via strategic hiring. UNT refers to these initially selected areas as *Research Clusters*. The Research Cluster program—now in its second round—provides the initial core around which this faculty hiring initiative will be built. Given the complexity, expense, and morale-implications of expanding selected areas of the university—coupled with the need to do so rapidly in order to ensure the plan’s success—the methods of choosing the targeted areas become critical. Building upon interdisciplinary research areas in which UNT faculty area already engaged, and selected through a bottom-up proposal, peer evaluation, and recommendation process, the current Research Clusters represent areas in which top research faculty can be (indeed, **are being**) aggressively recruited and hired. There are seven designated Research Clusters and an additional group receiving seed support for eventual growth into a full Research Cluster.

UNT Research Clusters

- Signaling Mechanisms in Plants
- Bio/Nano-Photonics
- Developmental Physiology and Genetics
- Materials Modeling
- Initiative for Advanced Research in Technology and the Arts
- Sub-Antarctic Ecosystems and Biocultural Conservation
- Renewable Bioproducts
- Human Health and Sustainable Environment (seed)

Recently completed and planned hiring to build the Research Clusters (shown in Table II.2) comprises 33 new faculty (two-thirds of whom will be senior hires). This is just over one fifth of the new research faculty needed in the first five years of this strategic plan.

Table II.2. UNT Research Cluster Hiring

Cluster	Completed		Searching		More Slated		Totals
	Junior	Senior	Junior	Senior	Junior	Senior	
Plant Signaling		2	1			1	4
Bio-/Nano-Photonics				2	2	2	6
Devel. Phys & Genetics	1			1		3	5
Materials Modeling	1			1	1	2	5
Adv. Technology & Arts		1		1		1	3
Sub-Antarctic				1	2	1	4
BioProducts				1	2	1	4
Health Sus. Environ (seed)				1		1	2
Totals	2	3	1	8	7	12	33
	5		9		19		

II.2.b. Additional Research Priorities

In addition to the faculty hired in the Research Cluster program, UNT intends to hire an additional 120 researchers within the first five years of the plan with specific emphasis on fundable research profiles. Taking Research Clusters into account, a limited number of research areas have been identified for strategic hiring specifically to enhance research funding. In order to make these selections rapidly, the target areas were selected by UNT’s senior leadership with input from the deans. These areas have the greatest and most rapid potential for newly-hired experts to generate substantial restricted research funding, increase Ph.D. production, produce economic development benefits, and raise UNT’s national as well as international visibility and recognition as a research university.

Expectations of the Hiring Process for Research Faculty

- Strong multidisciplinary
- Joint appointments
- Hiring decisions coordinated across colleges and schools
- Shared facilities
- Laboratories arranged by emphasis rather than by discipline or department

Taken together (Research Clusters and institutional priorities), UNT will target a limited number of research areas for investment and hiring. The specific areas of research emphasis are shown in the box on the next page. Faculty researchers hired in these strategic research areas must be capable of multidisciplinary collaborations and team efforts. To ensure the needed multidisciplinary, hiring will be coordinated across the colleges and departments. Many of these researchers should have joint appointments in multiple departments to create opportunities for team efforts and center/institute proposals. These faculty and their graduate students will interact and, when possible, co-locate based on research areas and needs for research facilities, rather than based on department/discipline. Thus, it is expected that many of their research facilities will be shared among several individuals or groups.

UNT Research Emphases

Next Generation Technologies

- cyber-security and web-archiving
- advanced materials for aerospace, biomedical, and nano-devices and applications
- micro/nano devices and systems for electronic, medical, and environmental applications
- advanced technology and the arts

Sustainable Endeavors

- renewable energy
- plant sciences and bioproducts
- conservation, environment, and sustainability

Human Decision-Making

- disaster and emergency management
- logistics and decision sciences
- cognitive and behavioral neuroscience

Human Health

- developmental physiology and genetics
- medical informatics
- imaging for medical, bio-identification, and geographical applications
- pharmacology
- music and physical health
- forensic science
- biomedical engineering including biomechanics

Synergistic Catalysts

- computational science and engineering
- human-machine interaction, communication, and design
- STEM education

II.2.c. Hiring Processes

To ensure that hiring in these emphasized research areas is coordinated and faithful to the goals of this strategic plan, the Provost and Vice President for Academic Affairs (Provost) will partner with the Vice President for Research and Economic Development (VPR) to oversee an iterative process to further focus the hiring priorities within each area. Following is a description of one potential structure that may be used to guide the hiring processes and decision-making.

Hiring will not proceed simultaneously in all of the emphasized areas. The Provost and VPR will consult with the deans and possibly with the chairs to select approximately five emphasis areas in which to begin hiring in each year of the plan, and will set the timeframes (usually two to three years) for hiring in each of the chosen areas. Prior to launching a search in each chosen area, the deans and chairs of the relevant academic units will be required to coordinate with the VPR and potentially narrow UNT's focus within

the emphasized area. This group will set the parameters within which proposed hires in the research area will be evaluated before the Provost will authorize a search. This process will take into account a variety of factors such as the impending availability of particular laboratory space, specific emerging priorities of federal funders, regional technological and economic development needs, readiness of key faculty to lead the searches, and collaborative potential, but not redundancy, with other centers of excellence in Texas universities. This latter consideration bears further explanation. It is critical for UNT to develop research areas and hire research faculty who have the capacity to collaborate with successful researchers at other institutions in the DFW area and elsewhere in the state. Care will be taken not to create redundancies that would merely cause *competition*. Collaboration and complementary development will be the goal.

As an example of this process, “renewable energy” might be selected by UNT as an area in which to hire for the up-coming year, due to large funding potential from the Department of Energy. The deans of the College of Engineering and the College of Arts and Sciences, as well as the chairs of the Departments of Mechanical and Energy Engineering, Materials Science and Engineering, Physics, Biological Sciences, and Chemistry will convene with the VPR to determine the appropriate UNT focus area(s) within renewable energy for recommendation to the Provost. This group might decide that one or two topics *within* renewable energy are the best foci for UNT. Then the deans, in consultation with each other and with the chairs, will make specific proposals to the Provost to launch searches for research faculty who fit both the general research emphasis (renewable energy) as well as the specific foci. A proposal to target an expert in an area of renewable energy inconsistent with the chosen foci would not be supported.

Another example might be cognitive and behavioral neuroscience. Relevant deans would be from the Colleges of Arts and Sciences, Business, Public Affairs and Community Service, and Education. Chairs would represent the Departments of Psychology, Biological Sciences, Linguistics and Technical Communication, Behavior Analysis, Information Technology and Decision Sciences, and Educational Psychology. Leaders in relevant disciplines at the UNT Health Science Center would also be consulted so that focal emphases could be chosen that would align with initiatives at our sister institution and take advantage of relevant research capacity and infrastructure.

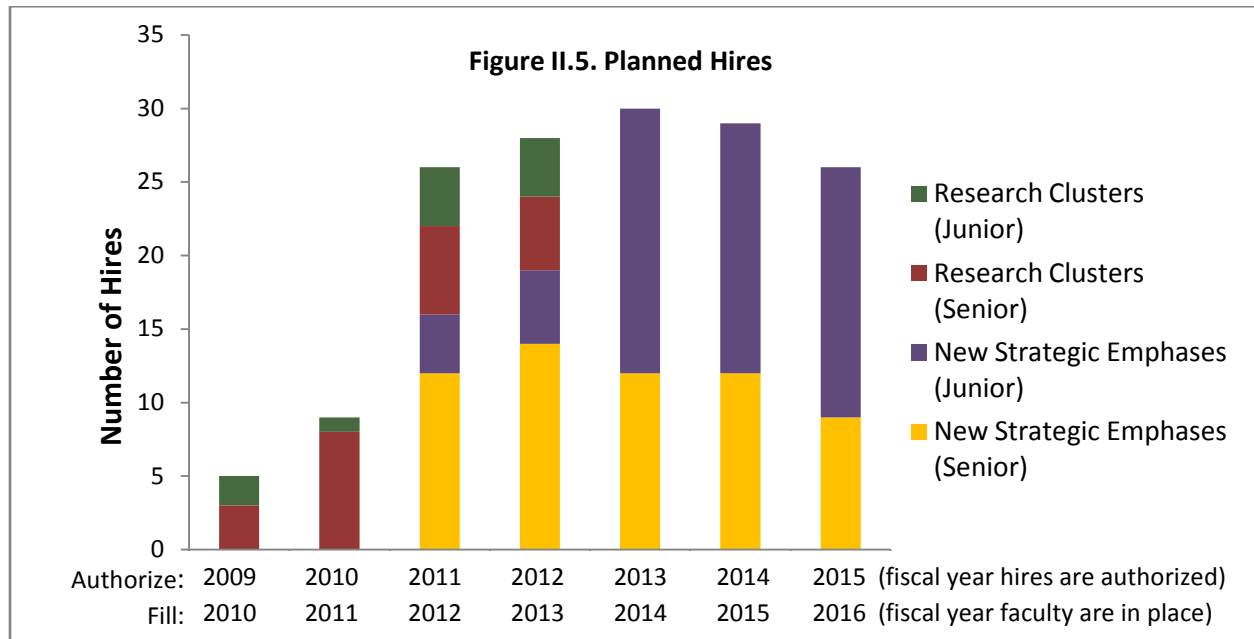
II.2.d. Hiring Plan

As stated above, some of these areas have already been targeted for hiring within the Research Cluster program; thus, they represent domains in which a significant core of expertise already exists at UNT. Other areas lack such a presence at UNT, but must be rapidly developed to target available funding sources and to leverage potential beneficial partnerships, including with the UNT Health Science Center.

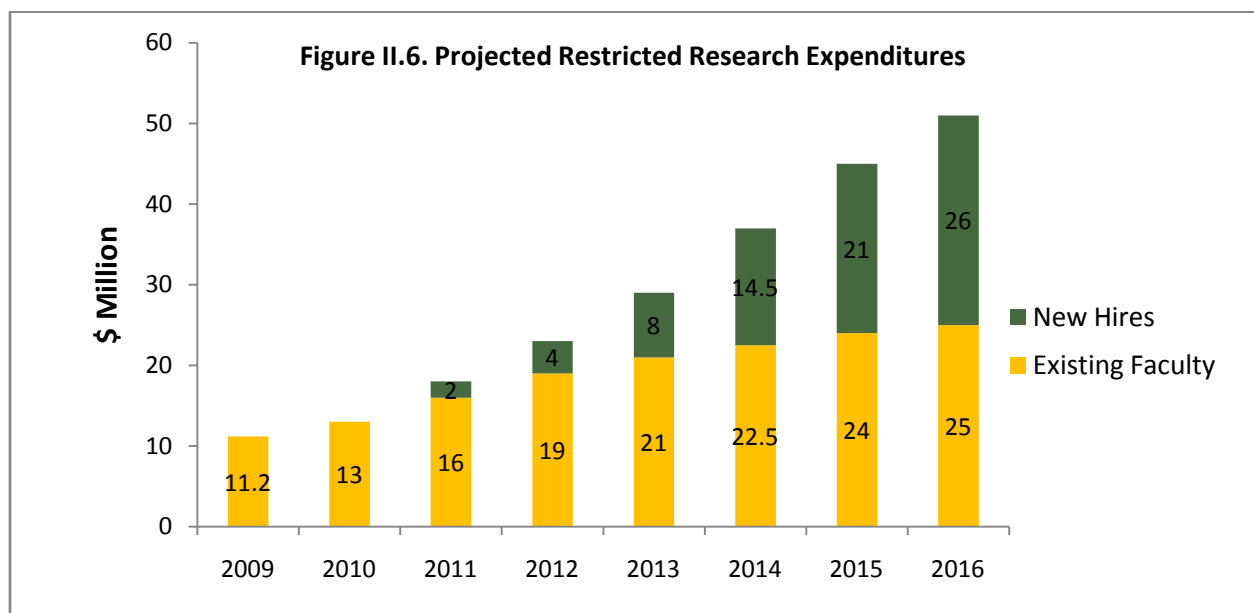
Of the 33 new hires directed toward the Research Clusters, 23 are designated as senior hires. Of the additional 120 researchers recruited into the areas of research emphasis, we anticipate that 50 percent will be senior faculty with ongoing external grant funding. The typical senior researcher hired will be expected to move to UNT with \$500,000 to \$1 million in ongoing research funding and to have a track-record consistent with maintaining and increasing those levels once at UNT. The remaining junior faculty hired in this initiative will be a mixture of junior scientists in cutting-edge domains, and other junior scientists with clear potential to generate external funding and to become national leaders in their fields.

Taken together, this research-focused hiring plan includes 153 research faculty (the five Research Cluster hires already in place, and 148 additional research faculty). In a few cases, the faculty recruited for the new emphasis areas may join UNT in the same fiscal year the searches are authorized (UNT has a robust

targeted hiring mechanism in place). However, in most cases, faculty are hired in the year subsequent to the search (hence, the next fiscal year). Figure II.5 shows the projected hiring pattern.



As these new faculty are hired, they will bring substantial research funding with them and will also begin generating new research grants at UNT. As research expenditures often require two to three-year spend-down periods, the increase in restricted research expenditures are expected to accelerate beginning in 2013. This will represent significant increments beyond the steady growth in research expenditures anticipated by current UNT faculty responding to the challenge to increase research productivity. The presence of these new research faculty will stimulate the development of large externally funded centers and institutes at UNT. By year five, our goal is to have at least three centers/institutes funded externally at levels exceeding \$2 million per year and at least five funded at \$1 million per year.

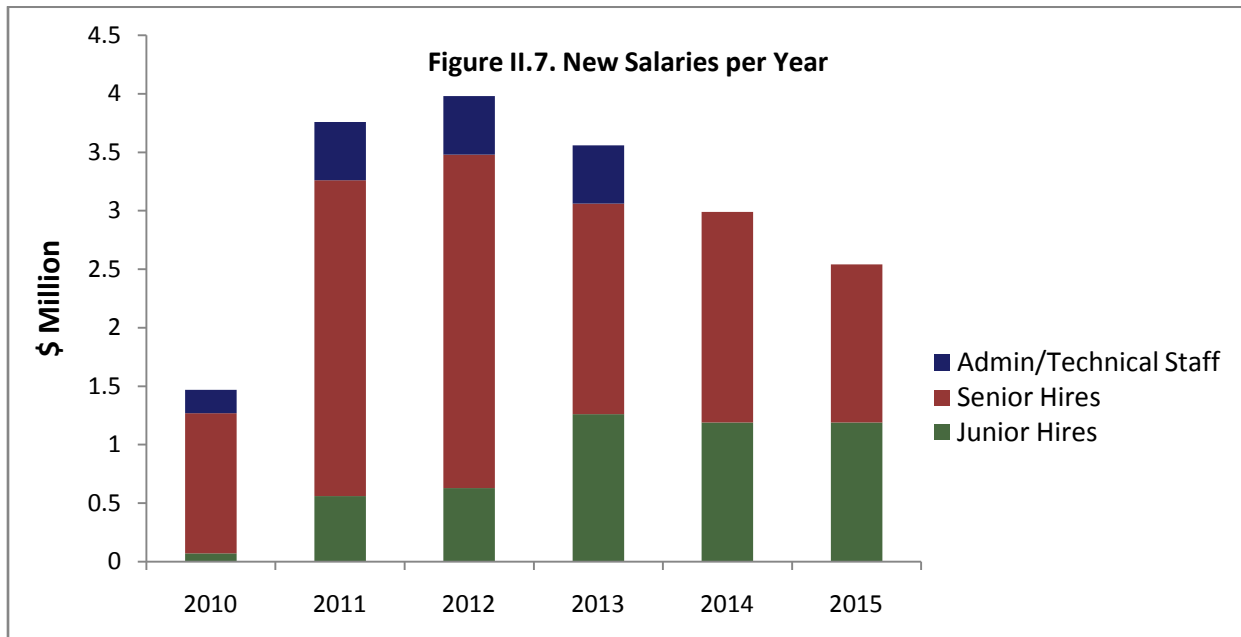


The majority of restricted research expenditures projected in the current plan are expected to derive from competitive research grants obtained from federal and state agencies. However, federal appropriations, corporate research grants and partnerships, as well as donations received by UNT specifically to support research are expected to provide contributions to the overall research funding as well. The UNT Office of Advancement will integrate the research priorities described above in its strategic plan and fundraising. This will provide UNT fundraisers with an unprecedented level of alignment with university priorities to position fundraising efforts for success. Because fundraising is more successful for projects that: (1) clearly align with the university’s priorities and direction, and (2) are in areas in which the university is making an investment, the current plan will allow UNT fund-raisers to make a strong case to potential donors. In addition to providing funds for direct expenditure on research, these gifts to support research also will qualify to be submitted to the THECB for matching funds through the Texas Research Incentive Program (TRIP). Although deposits from all seven emerging research universities on September 1, 2009 resulted in the expenditure of all the state funds set aside for TRIP (\$25 million in FY 2010 and \$25 million in FY 2011), additional state matching through TRIP funds is expected in the future. The THECB is encouraging the universities to continue to submit all qualifying gifts. THECB officials emphasize the importance of this effort: these continued submissions will demonstrate the success of this program to legislators and influence them to replenish the fund. Additional UNT submissions (above and beyond the \$2.6 million submitted on September 1) already include approximately \$907,000 (as of March 2010) that should be eligible for 50 percent match.

II.3. Allocation of Resources to Achieve Goals

II.3.a. Cost of the Hiring Plan

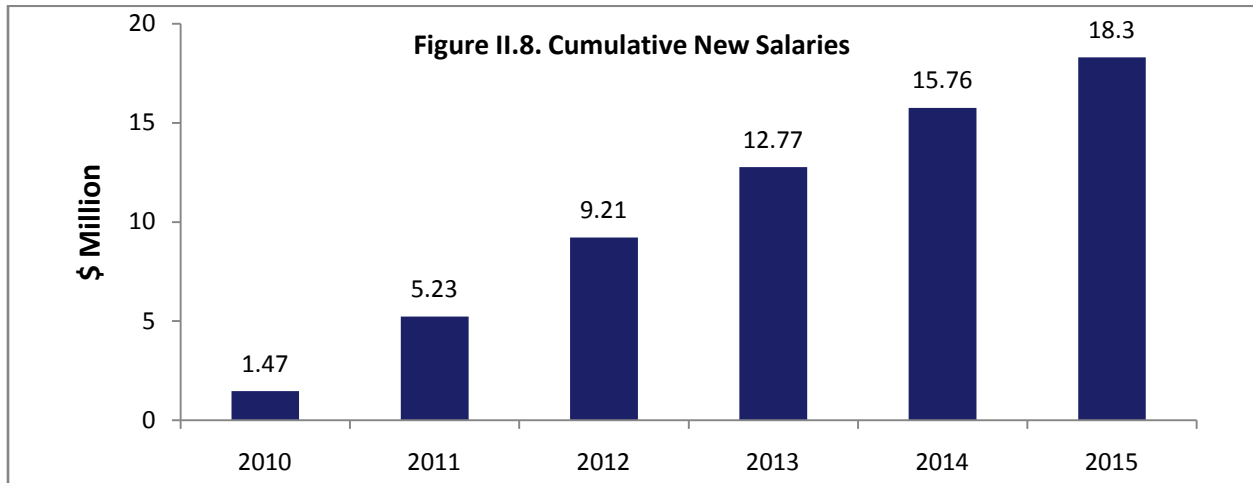
Substantial investment will be required to pursue a plan that leads to \$45 million in restricted research funds within five years. The yearly new salary costs to be incurred during the five-year hiring window are estimated in Figure II.7.



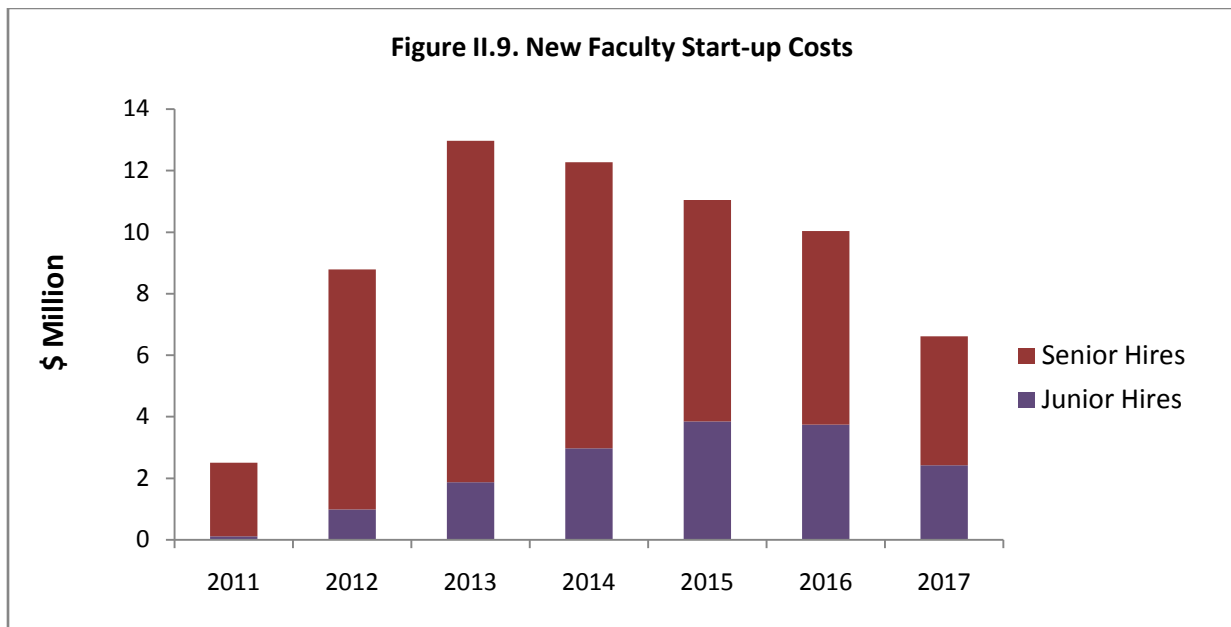
Note: Salary funds will be allocated in the fiscal year in which the searches are authorized. Salary savings from positions not filled until the subsequent fiscal year will be utilized to defray start-up costs (see Figure II.12) in the subsequent year.

As noted in Figure II.7, a modest amount of investment is also required for administrative and technical staff salaries to ensure that the newly hired research faculty are adequately supported.

Because salary costs are recurring expenses, the cumulative salaries costs, once incurred, must become part of the institutions annual base budget. The cumulative salaries associated with this hiring plan through 2015 are therefore presented in Figure II.8.



In addition to salaries, investments in one-time start-up expenses to recruit and equip these faculty are essential. It is expected that a substantial proportion of start-up funds will be spent to build facilities and/or to purchase equipment that can be utilized by multiple researchers. These one-time expenses for faculty hired to begin in 2011 onward are estimated in Figure II.9. The projections extend through 2017 (a year beyond this phase of the hiring plan), because these funds are expected to be expended over a two-year period for each cohort hired.



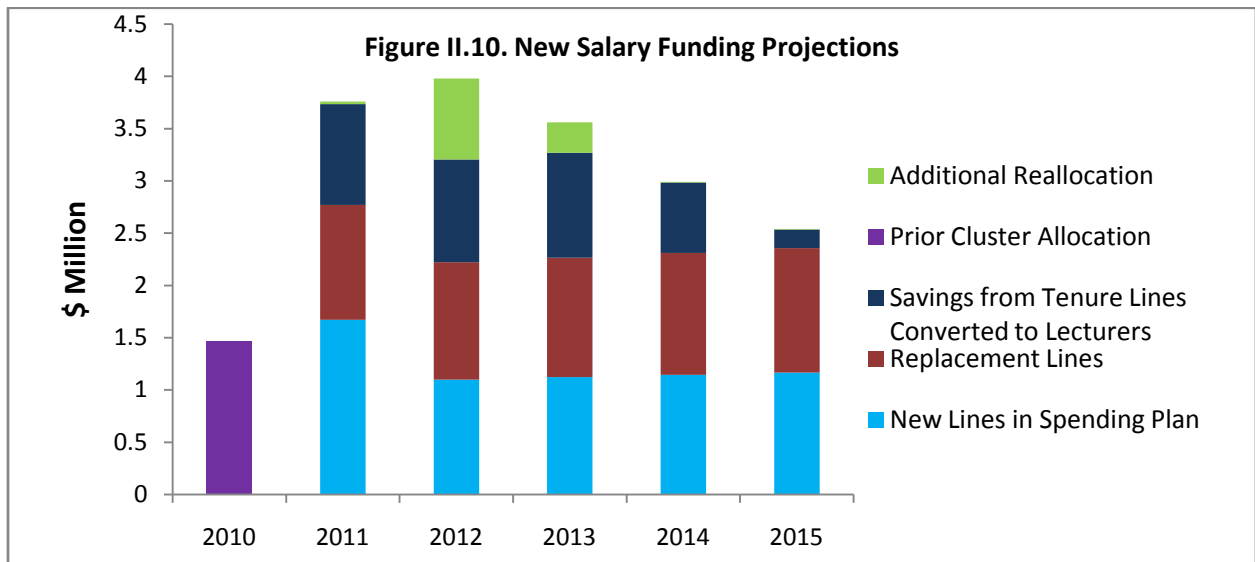
In summary, the recurring and one-time expenses associated with this hiring plan are presented:

- Cumulative costs recurring
 - Faculty salaries: \$16.6 million
 - Other salaries: \$1.7 million
 - **Total recurring (beginning 2015 forward): \$18.3 million**
- Cumulative costs non-recurring 2011 through 2017
 - Faculty start-up cost
 - **Total non-recurring (2011-2017): \$64.25 million**

II.3.b. Allocating Resources to Pay for the Plan

Funding this hiring plan will require a combination of sustained (already-committed) funding of the Research Clusters, increased revenue from growing student enrollment and tuition increases, internal reallocations of faculty lines from new and replacement positions, reinvestment of substantial proportions of indirect costs recovered from grants awarded, allocations from the state’s Research University Development Fund, fundraising/endowment expansion, corporate partnerships, state and federal appropriations, and institutional reserve funds.

The reallocation strategy involves evaluating all tenure system faculty positions that become vacant for their potential conversion either (a) to a research focused-position as part of this plan, or (b) to a lecturer position that will focus on high-quality teaching of a greater number of courses, yielding additional funding to invest in the research-focused faculty hiring. For example, two vacant tenure system faculty positions in a teaching-intensive area might be converted into a single lecturer position that would cover the teaching load equivalent of two tenure system faculty members. The recovered salary funds would then be invested into a research faculty position in a content area consistent with the research priorities. Salary and start-up costs would be handled as shown in Figure II.10 and II.11, respectively.



Note: Funds noted as “New Lines in Spending Plan” are contained in the current UNT spending plan for 2011 and 2012 approved by the UNT Board of Regents; funding for the lines for the spending plan in 2013-2015 will need to be included in subsequent spending plans.

This hiring plan relies heavily on adequate numbers of replacement faculty positions being available (the brown and dark blue components of Figure II.10). In other words, an adequate number of faculty positions must become vacant on a yearly basis due to faculty retirements or relocation. UNT makes every effort to retain talented and productive faculty at all levels. However, it is critical that UNT also enable the creation of vacant faculty positions when doing so is in the best interests of the institution. Of course, probationary reviews and the ultimate tenure decisions of tenure-track faculty allow UNT to terminate unsuccessful faculty and reinvest those resources in new hires. Likewise, UNT is investigating available legal and appropriate options for incentivizing retirement of some senior faculty. Many senior faculty are highly productive in ways completely consistent with UNT’s current mission and vision. Other senior faculty, particularly those who were hired when priorities were dramatically different, are not likely to contribute to the research priorities. When appropriate, UNT plans to implement measures to incentivize early utilization of retirement benefits so that those faculty positions can become part of the allocation plan to hire research faculty.

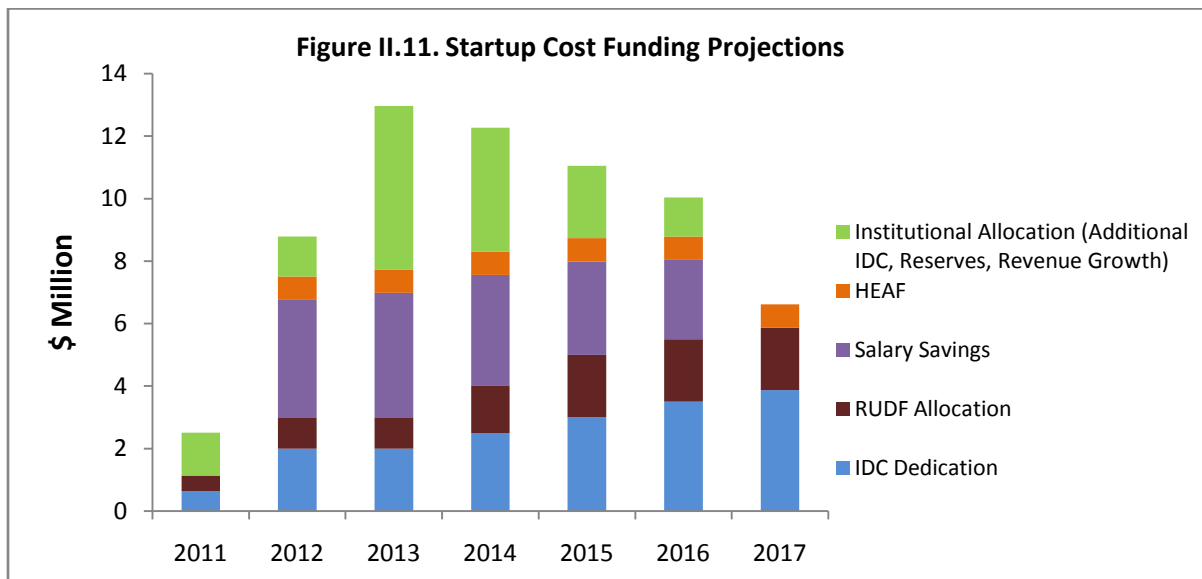
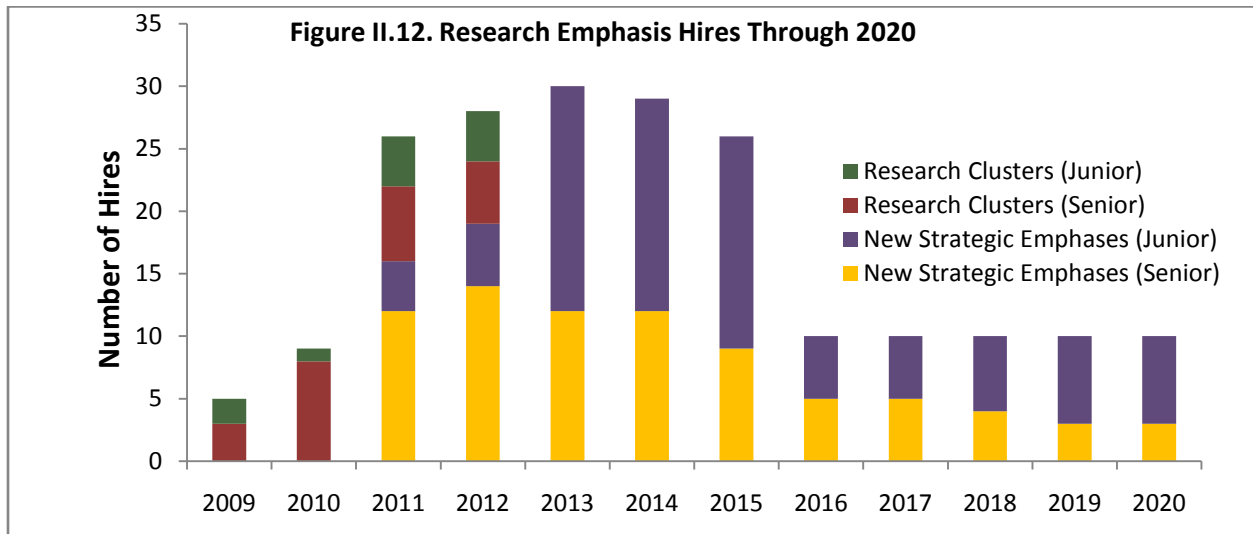


Figure II.11 shows the funding projections associated with faculty start-up costs. Components of Figures II.10 and II.11 noted as “Institutional Allocation” are those for which funding must be identified and allocated from sources that are not fully predictable from year to year (increased revenue from growing student enrollment and tuition increases, fundraising/endowment expansion, additional IDC dedication, corporate partnerships, and state and federal appropriations). If these variable sources of funding are not sufficient to cover the needs, then institutional reserve funds will be considered to keep the plan on track.

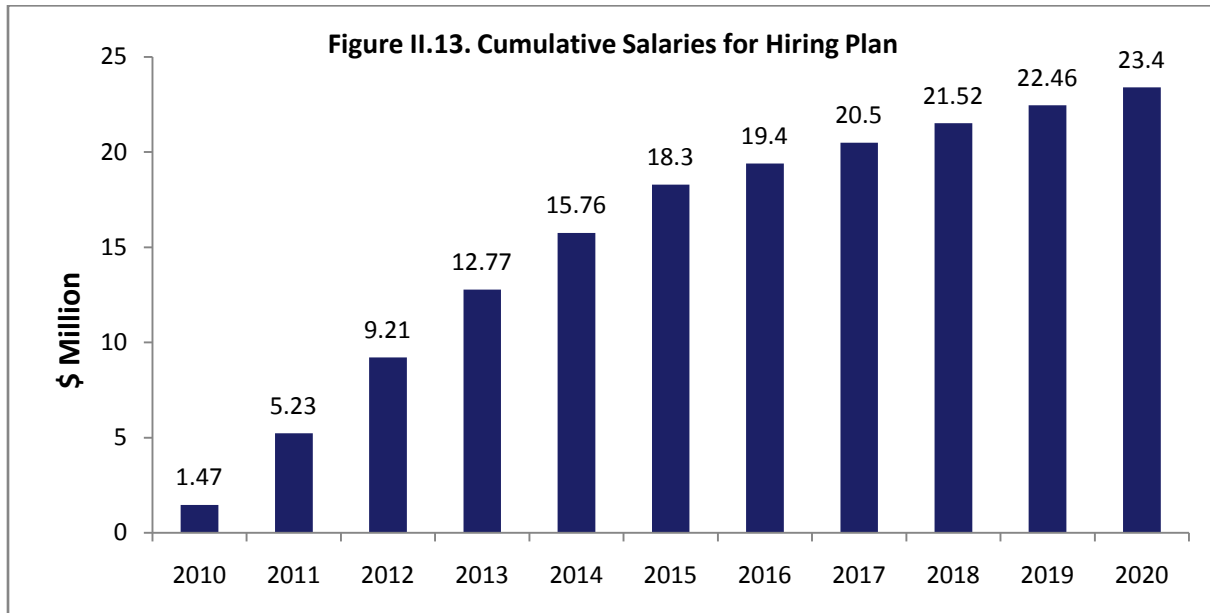
II.4. 2016 and Beyond

As emphasized in the vision statement, reaching the funding goals in 2016 is only the first major step in achieving national research university status. By 2016, UNT will have the type of faculty in place to sustain consistent growth in research endeavors. Thus, the aggressive hiring plan described above will not need to be continued with the same intensity into the next period of growth. Most faculty hiring can proceed in the context of replacing faculty who retire or otherwise vacate a position and as enrollment

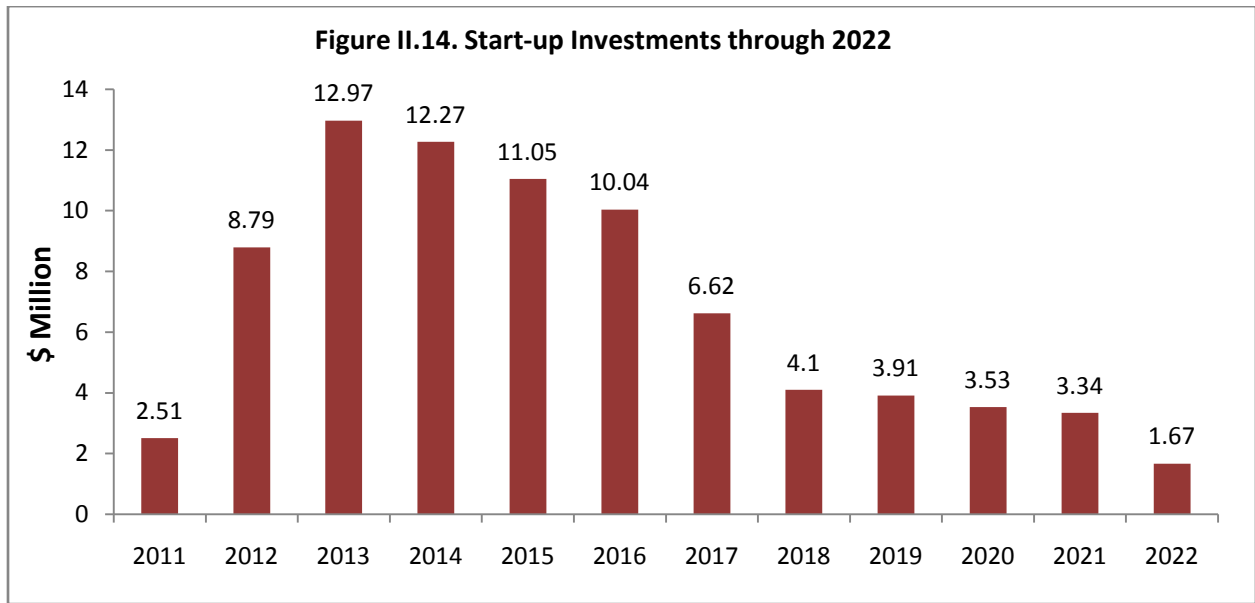
growth warrants expansion to maintain faculty-student ratios. From 2016 to 2020, we expect that approximately 10 replacement hires per year will be devoted to the selected areas of research emphasis. Figure II.12 shows the research-intensive hiring plan carried through hiring to be authorized in 2020.



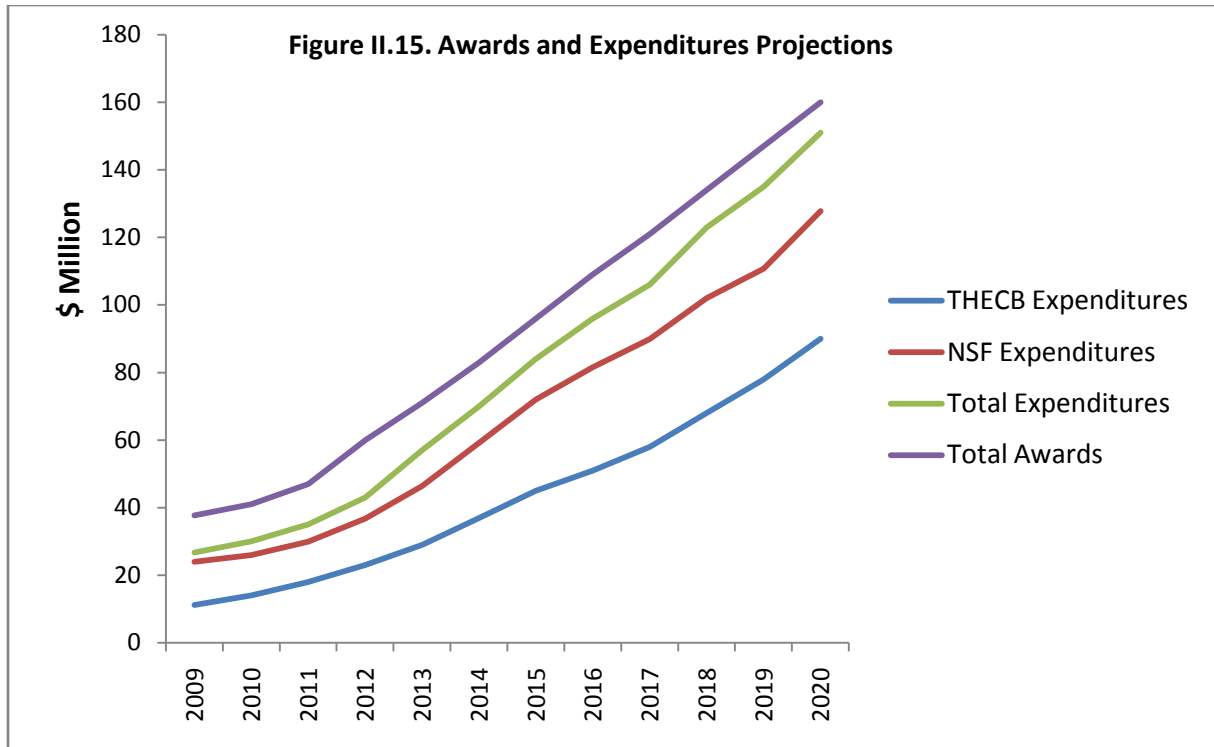
By extending the hiring plan through 2020, investment in faculty salaries accumulates to \$23.4 million in continuing funds from 2020 onward (Figure II.13), with a total of \$170 million being invested in these salaries from 2010 to 2020.



To depict the entirety of investments in start-up packages over the course of the hiring plan, Figure II.14 shows annual investments through 2022 (the last year start-up funds will be allocated to faculty hired in 2020 for 2021 start dates). The total investment in faculty start-up packages reaches \$80.8 million by 2022.



With restricted research expenditures in excess of \$45 million, access to the NRUF will allow increased investment in research infrastructure and support services for faculty. Likewise, increments in the Research University Development Fund will double as the \$50 million threshold is exceeded, yielding an additional \$3 million annually in the first year, and an additional \$1 million each time successive \$10 million expenditure benchmarks are reached. These additional resources, combined with effective corporate partnerships, state and federal appropriations efforts, and research-related philanthropic gifts, will allow UNT to continue to build on its successes and achieve national research university status by 2020.



II.5. Ensuring Graduate and Undergraduate Student Participation in UNT Research

II.5.a. Undergraduate Research

Research experiences for undergraduates nurture the next generation of scholars. Such experiences expand opportunities for the brightest and most engaged undergraduates to achieve higher levels of academic success. This plan includes a number of opportunities for undergraduates to participate in the areas of research emphasis noted above, as well as in areas represented by faculty researchers and scholars across the university.

Ongoing and planned activities designed to support undergraduate research efforts include:

- Undergraduate Research Initiative – a program that provides funding for up to seven departmental projects that pair students and faculty on faculty-guided research projects.
- Honors College Research Track – an academic option designed to prepare Honors College students for academic research by providing research courses, faculty mentoring, opportunities for presentations and publication, hands-on research experience, and funding for travel to professional meetings.
- *The Eagle Feather* – a publication of the Honors College that offers a fully searchable journal of undergraduate research. UNT undergraduates can access this journal as a scholarly study resource, and they may also submit reports of their own research for possible publication in the journal.

II.5.b. Graduate Research

The involvement of graduate students, particularly doctoral students, in research is not *in addition to* their academic studies, but rather part and parcel of their degree pursuits. Nearly all current UNT faculty who

are involved in the Research Clusters and/or areas of research emphasis are mentoring Ph.D. and other graduate students in the context of that research. Faculty who will be recruited to UNT as part of this hiring plan are expected to include doctoral students in the research; indeed, many will negotiate to bring one or more Ph.D. students to UNT as part of the move. Many of the initiatives of UNT's Toulouse School of Graduate Studies (examples of which will be described in detail in the *Plan for Doctoral Programs* section of this strategic plan) are geared toward recruiting the very best possible doctoral students for UNT programs, involving them successfully in research-oriented academic curricula, and progressing them toward degrees in a timely fashion. The Toulouse School of Graduate Studies partners with the Office of Research and Economic Development on a number of programs geared to promote graduate student research success.

- *Coordination of Funded RA Stipends and Tuition Support.* Grant proposals that include graduate research assistants must budget stipend levels commensurate with disciplinary standards, and must include funding for tuition and fees (where allowed by the funding agency).
- *Dissertation Grant-Writing Workshops.* These annual workshops are co-facilitated and co-funded by the Toulouse School of Graduate Studies and ORED. Selected participants are provided summer stipends to complete the workshops and submit their research plans to national-level dissertation grant competitions.
- *Responsible Conduct of Research Training.* All graduate students involved in research need training in research ethics and responsibility. The Toulouse School of Graduate Studies and ORED collaborate to provide a combination of online and face-to-face training in these concepts, and also monitor participation on the part of students.

Summary of Plan to Increase Research and External Funding

- Analysis of research funding and expenditures
- Set goals:
 - \$45M THECB restricted research and \$75M NSF-calculated expenditures by 2015
 - \$90M THECB restricted research and \$125M NSF-calculated expenditures by 2020
- Reach goals by motivating and facilitating current faculty
- Reach goals by hiring additional faculty
 - Research Clusters: 5 faculty already hired, 28 more planned (~67% senior; ~33% junior)
 - Other institutional priority research areas: 120 hires planned (~50% senior; ~50% junior) in first phase (2010-2015), 50 hires in second phase (2016-2020)
- Fund the plan via internal reallocations, new resources from growth in enrollment, indirect costs recovered and from increased external grant funding, fundraising, state and federal appropriations, and corporate partnerships
- Effectively involve undergraduate and graduate students in research



III. PLAN TO IMPROVE UNDERGRADUATE EDUCATION

III.1. Freshmen Admissions Selectivity Programs

Because the THECB continues to refine rules, metrics, and benchmarks that will be used to determine student quality and diversity, this aspect of the plan will continue to develop as additional clarification is provided.

UNT is currently classified in general ratings of universities across the nation as having selective admissions. The strategies and requirements that have led to this classification will be leveraged and adjusted to enroll a freshman class with even higher test scores and class ranks. In particular, UNT continually evaluates its admission standards and has recently tightened its requirements. Higher standards often lead over time to the attraction of top students. Under this plan, UNT will increase its critical review of student applicants with test scores and class ranks below that expected for national research university qualification.

UNT is a leader in Texas for its admission of an ethnically diverse and large freshman class. To ensure that increased standards do not disproportionately affect particular groups, UNT will carefully monitor its policies and will actively pursue recruitment of the top students from underrepresented groups from such prominent lists as the National Achievement Scholars and National Hispanic Scholars.

UNT's ever-improving reputation, as evidenced by recent *U.S. News and World Report* rankings, contributes to our ability to attract top students. To attract yet more top students, UNT will continue educational and marketing efforts about the high quality of education and research available and ongoing at UNT.

An important component of recruiting quality freshmen is the availability of undergraduate merit scholarships. UNT is regularly one of the top four or five Texas public universities in terms of new National Merit Scholars enrolling each fall. UNT will continue to leverage its Meritorious Scholarship program to attract an increased number of National Merit Scholars. The Meritorious Scholarship program will be fully funded to award all eligible and interested National Merit Finalists.

The university will continue to evaluate its overall scholarship capacity, competitiveness, and pricing strategy in order to have an effective scholarship program that appropriately balances financial need and meritorious performance. Current merit scholarship efforts focus on incoming students at the highest academic level as well as student with identified leadership potential. Scholarships for continuing students aim for the twin goals of recognizing outstanding student performance and garnering national recognition for the institution.

- Meritorious Scholarship Program – This activity offers fully-funded, renewable scholarships to all National Merit Finalists.
- Terry Scholarship program – This activity offers fully-funded, renewable scholarships to up to 16 students based on their record of leadership and academic success.
- Honors College Scholarships - Honors College Scholarships are awarded to excellent students who participate in Honors classes and programming; outstanding freshmen who have been admitted to the Honors College are also considered.

- Nationally Competitive Awards – This activity targets students with high potential and mentors them through the application and review process for scholarships of national stature including the Goldwater, McNair, and Udall awards.

The goals for the freshmen admissions selectivity programs (as currently conceptualized) include:

- By 2015 the profile of the incoming first-time, first-year entering freshman class will have the following characteristics.
 - 75 percent will be from the top 1/3 of the high school class.
 - The average SAT score will be 1150.
 - 95 percent will have IB, AP and/or dual credit.
 - The class size will be 3,500 students.

UNT will pursue a variety of initiatives to meet its goals in recruiting a high quality entering freshman class each year. These initiatives include:

- Increase admissions requirements to attract increasingly talented freshmen.
 - Implement an earlier priority admission application date.
 - Reduce admissions of students with lower than desired test scores.
 - Reduce admissions of students with lower than desired class ranks.
- Increasingly execute tailored admission decision processes that consider the many aspects of an applicant's credentials. For example, students with lower class ranks but who have high test scores and who are from high performing high schools will be carefully evaluated in admission review processes. In the event such an applicant does not meet the university's automatic test score and class rank requirements, the student may be admitted based on the considered review of additional attributes of the student's credentials.
- Provide additional merit-based scholarships to high quality applicants. Students with top scores and/or class ranks will be rewarded with competitive and commensurate scholarship awards.
- Provide high quality recruitment information that targets high achieving students.
 - Web-based materials and systems will target these students.
 - Print publications will reflect the academic rigor and quality of the university to recruit top students.
 - Honors College materials will be enhanced.
 - General university publications will be enhanced.
 - Academic college, department, and program materials will be enhanced.
- Increase outreach to SMSA's beyond DFW to attract top students.
 - Emphasize recruitment in Houston area.
 - Emphasize recruitment in Austin/San Antonio area.
- Develop specialized recruitment efforts for top students.
 - Increase specialized campus tour opportunities.
 - Increase the reach of recruitment of top students through search lists.
 - Provide technologically appealing recruitment information such as self-service tools, personalized online admission information, and other specialized applications for students that match their paths for accessing university information.

- Continue targeted recruitment of National Merit, National Achievement, and National Hispanic Scholars.
- Expand Honors program admissions and designated Honors housing.
- Continue to increase the university's overall reputation.
 - Success with research, *Closing the Gaps*, and other efforts to improve the attractiveness of UNT to high quality students.
 - Execute first-rate communications with high schools and counselors.
 - Maintain presence, visibility, and leadership in relevant organizations such as College Board, NACAC, TACRAO, NASFAA, etc.
 - Maintain visibility in state committees such as Apply Texas, Financial Aid Advisory, P-16, etc.
- UNT will continue to pursue and acquire external funding to enhance and expand selectivity efforts, particularly from the THECB.
- Increase the number of highly qualified international students. Targeted efforts toward recruiting students with top credentials and from top schools will be implemented.

III.2. Progression and Timely Graduation Programs

UNT has created an academic unit, Undergraduate Studies within the Provost's office, to focus on two industry-standard measures – progression rate and graduation rate – of the quality of each incoming class of students. Progression rate measures the percentage of a fall semester entering class that re-enrolls on a full-time basis for the following fall semester. The graduation rate is typically measured on four and six-year bases.

Undergraduate Studies delivers an array of programs designed to increase the progression rate, a necessary condition for increasing the graduation rate. In addition, the unit leads a coordinated campus effort to impact timely graduation through more effective academic advising (an important contributor to student success, as measured by graduation with the baccalaureate). The goals for progression and graduation for each year of the plan are as follows:

- Increase of 2 percent per year in the progression rate of first-time, first-year students
- Increase of 1 percent per year in the four and six-year graduation rate

To achieve these goals, Undergraduate Studies will carry out predictive progression modeling using pre-matriculation and survey data. A statistical model will be developed to predict student progression, and the model results will be monitored to adjust the advising strategies, student awareness campaigns, and the development and implementation of other programs to increase progression and graduation rates.

III.3. Curriculum Improvement Programs

Student engagement in the classroom is an important component of a quality undergraduate education. The ongoing approach for improving instructional quality through increased student engagement involves an extensive program of course redesign. Focused on large lecture courses in the University Core Curriculum (Core), the course redesign program allows full-time, permanent faculty the opportunity to transform traditional lecture-style courses into courses combining an optimal combination of lectures, online course content and interactive and small group experiential learning activities to help students make connections between course content and its application. Focusing on the Core directs the

educational benefit to students early in their academic careers since first-year students typically start taking Core courses in their first term.

In addition to course redesign activities, UNT established a community of scholars whose activities are aimed at expanding and sustaining the array of engaged-learning courses offered in the Core Curriculum. These full-time, permanent teaching faculty direct their efforts to improving pedagogy to increase student engagement and success.

Finally, plans for quality improvement in undergraduate education include an online student evaluation of teaching and directing resources toward maintaining and eventually improving the student/faculty ratio.

The instructional quality enhancement goals for the plan period include: completing the redesign of at least four Core courses in each year of the plan; adding one teaching faculty member to each area of the Core in each year of the plan; reaching a 75 percent completion rate on the student evaluation of teaching by the end of the plan; reducing the student/faculty ratio to 20:1. The specific activities aimed at improving the undergraduate educational experience include:

- Quality Enhancement Project (QEP) – This activity is the course re-design project begun as part of the SACS accreditation exercise.
- Core Academy – This is the group faculty dedicated to supporting engaged learning through improved course design and delivery.
- Center for Learning Enhancement, Assessment, and Redesign (CLEAR) – This unit supports the QEP by providing course re-design expertise and general faculty development resources directed at improving instruction.
- Student Evaluation of Teaching Effectiveness (SETE) – This activity includes the campus-wide implementation of a common student evaluation of teaching, delivered online and available to all students and instructors of record.
- Student/faculty ratio – The university spending plan allocates resources to new faculty positions each year to maintain its student/faculty ratios as enrollment increases.

III.4. Closing the Gaps

UNT has contributed significantly to the goals set forth in *Closing the Gaps* regarding participation and success of disadvantaged students. In particular, as the leading transfer institution in Texas, UNT has enhanced the ability of Texas students to make successful transitions from community colleges to the university. UNT will continue its success in *Closing the Gaps* by continuing the following activities:

- While the size of the freshman class will remain relatively stable, the entering test scores and class ranks of students from underrepresented groups will rise.
- The university will contribute to increasing participation in Texas by capitalizing on its strength in transfer student recruitment.
 - Grants such as the university's THECB 2+2+2 award will be leveraged.
 - The university will increase connections with students at community colleges.
 - The university will enhance its articulation and transfer databases, and its technology to facilitate successful and increased transfer.

- The university will develop centralized articulation coding capacity to enhance its degree audit system to increase the timeliness and accuracy of degree plans for all students, particularly transfers.
- The university will pursue opportunities to collaborate with community colleges, their faculty and their students through various means such as curricular alignment, P-16 collaboration, and multi-institution teaching sites such as the Collin Higher Education Center.
- The university will continue to attract one of the state's most diverse student populations through its collaboration with numerous high school-to-college programs such as the award winning University Crossroads collaborative in Dallas, Education is Freedom, and UNT's own Emerald Eagle Scholars program.
- The university will continue to be a leader in the state for awarding degrees to Hispanic and African-American students. Aggressive recruitment of a diverse freshman class as well as continued success in enrolling one of the largest cohorts of transfer students in the country will lead this effort.
- Progression and completion rates will rise throughout the time span of the plan as indicated in Section III.2.

III.5. UNT and Excellence in Undergraduate Education

UNT provides an excellent education for its undergraduate students. While pursuing national prominence in research productivity, UNT will maintain and improve the quality of the undergraduate experience. Key components of these efforts include *increasing the quality of the entering freshman class, improving progression and graduation rates, improving curricula*, and continuing UNT's successful initiatives toward *Closing the Gaps*.

Improving Undergraduate Education

- By focusing on freshmen admissions selectivity programs, merit scholarships, and targeted recruiting, the entering freshman class will have an improved profile by 2015:
 - 75% from the top 1/3 of the high school class
 - Average SAT score of 1150
 - 95% will have advanced college preparation
- By attending to predictive progression and student services, UNT plans to:
 - Increase progression rates by 2 percent per year through 2015
 - Increase graduation rates by 1 percent per year through 2015
- Through creative course redesign tools, effective teaching evaluations, and attention to the student/faculty ration, UNT plans to continually engage in innovative curriculum improvements.
- By capitalizing on effective recruitment and transition services for transfer students, UNT will continue being a leader in providing access to undergraduate education and assist Texas with *Closing the Gaps*.

IV. PLAN FOR DOCTORAL PROGRAMS

UNT provides comprehensive graduate education in a solid core of programs ranging from Music Theory to Psychology to English to Materials Science and Engineering. Forty-nine doctoral programs and more than 100 master's programs are offered across ten academic colleges and schools. The doctoral degrees offered reflect UNT's strong tradition in teacher education, international acclaim in the performing arts, dedication to the humanities, and an increasing focus on STEM research.

UNT has significantly increased funding over the last several years to enhance our graduate programs. It has invested more than \$6 million in the last three years; beginning in academic year 2009, more than \$3 million are allocated to continuing funds to increase graduate student stipends across the university, to provide tuition scholarships, and to expand the number of centrally funded graduate fellowships. These investments and the other initiatives described below will allow us to recruit, retain and graduate the next generation of scholars, innovators and entrepreneurs necessary to support our research goals.

IV.1. Existing Doctoral Programs

IV.1.a. Overview

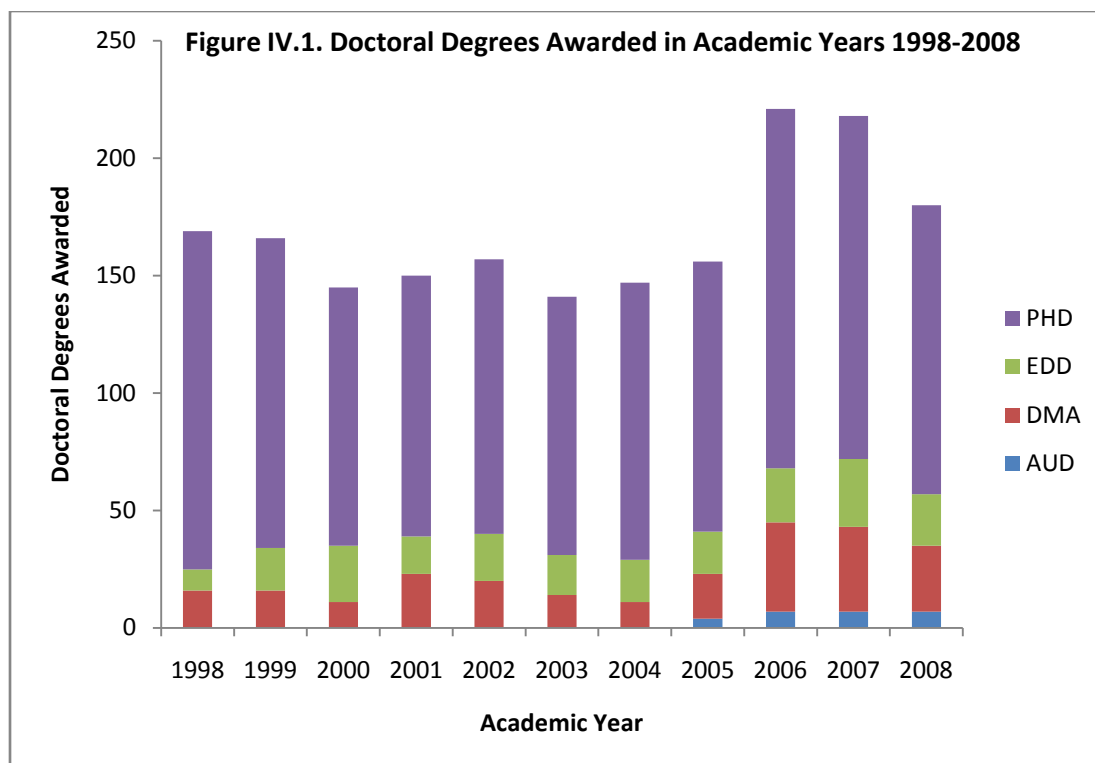
Graduate enrollment at UNT increased by 10 percent in Fall 2009 over Fall 2008. Enrollment in graduate engineering programs increased by 25 percent and graduate business programs saw an 18 percent increase. Overall graduate enrollment in Fall 2009 exceeded 7,600, comprising 21 percent of UNT's total enrollment. A portion of the enrollment increase is likely due to national economic conditions, but enhanced marketing and recruiting activities have also played key roles. Targeted, intentional recruitment is an important part of our plan for growing and sustaining quality graduate programs.

IV.1.b. Degree Productivity Goals

Figure IV.1 shows UNT doctoral degrees awarded in Academic Year (AY) 1998 through AY 2008. The average annual number of degrees awarded over the last three years (AY 2006-08) was 34 percent higher than the average over the previous eight years (AY 1998-2005). This trend can, in part, be attributed to sustained efforts to increase support for faculty and graduate student scholarship. The increase in graduate assistantship stipend levels implemented this year is anticipated to accelerate this trend, resulting in more competitive graduate student recruiting, higher retention rates, shorter degree completion times, as well as increased research and degree productivity.

An average of 206 doctoral degrees and 141 Ph.D. degrees were awarded annually over AY 2006-2008 (see Figure IV.1). As part of this strategic plan, our degree productivity objectives will be to:

- Increase doctoral productivity with 200 Ph.D. degrees awarded annually by 2015
- Increase overall doctoral degree productivity to approximately 300 annually by 2020, with at least 90 percent Ph.D.s.



IV.1.c. Strengths and Opportunities

IV.1.c.i. Retention and Graduation Rates. UNT Ph.D. programs in Biology, Psychology, Information Sciences, Finance, Counseling and Higher Education, and Business Computer Information Systems have strong records of timely graduation and overall graduation rates. These programs also exceed national benchmarks for graduation. On the other hand, the programs in History, Political Science, Mathematics, Computer Science and Engineering, Learning Technologies, Teacher Education and Administration and Music Theory have attrition rates well above national averages and correspondingly low graduation rates. Resource allocation decisions have been, and will continue to be, made based on program performance. In particular, recently established centrally-funded graduate tuition scholarships were allocated to programs based on graduation, retention and faculty scholarly productivity metrics. Additional tuition scholarships and stipend packages will be allocated for Fall 2010 recruitment (a total of more than \$6 million of new funds; \$3 million recurring). The allocation will be directed towards strategic science, technology, engineering and mathematics (STEM) areas and high-quality graduate programs as demonstrated by graduation, attrition and student accomplishment metrics. Initiatives to support improving program performance are currently being implemented and programs not responding will face reallocation of resources, including loss of funded graduate student positions.

IV.1.c.ii. Degree Balance. The College of Arts and Sciences and the College of Education have traditionally contributed the greatest proportions of UNT doctoral degrees awarded. Doctoral degree production has become more distributed as the number of D.M.A degrees awarded by the College of Music has increased and enrollment has grown in the College of Information. The contribution of non-Ph.D. degrees – Ed.D.s and D.M.A.s – to overall doctoral degree production has trended up from 15 percent in AY 1998 to over 30 percent in each of the last three academic years. This statistic is double-

edged – it indicates the quality reputation of our Colleges of Music and Education as well as the necessity for increasing Ph.D. production across the rest of the university. As discussed more below, we intend to:

- Maintain current Ph.D. productivity in the College of Information
- Increase Ph.D. productivity in the College of Arts and Sciences, College of Engineering College of Education, and College of Music
- More tightly focus resources to Ph.D. programs within the College of Business and College of Public Affairs & Community Service that support university research objectives

IV.1.c.iii. Ph.D. Productivity. During AYs 2004 through 2008, three programs accounted for more than 40 percent of the Ph.D. degrees awarded – Psychology, Counseling and Higher Education, and Library and Information Sciences. Psychology accounted for nearly 18 percent of all Ph.D.s awarded across the university and 43 percent of Ph.D.s awarded within the College of Arts and Sciences. The Ph.D. programs in Psychology have strong national reputations, yielding competitive applicant pools and enrollment of highly qualified students. Likewise, the programs in Counseling and Higher Education and Library and Information Sciences are efficient in mentoring students towards degree completion, and graduates are in high demand in the workplace. We intend to continue supporting similar or higher numbers of Ph.D.s produced by Psychology, Counseling and Higher Education, and Library and Information Sciences. At the same time we will invest additional resources to increase the production capacity of targeted programs in science, engineering and business, bringing a more appropriate balance to degree production. These resources will come from allocation of future tuition revenue and reallocation of graduate student funds from low producing programs. The hiring plan (Section II above) will bring many faculty to UNT who will also bring Ph.D. students with them, as well as be instrumental in attracting high quality Ph.D. students in the coming years.

IV.1.c.iv. STEM Degree Programs. Ph.D. degrees awarded in STEM disciplines have trended up from 36 in AY 1998 to greater than 50 in each of the last three academic years. The increase reflects investments made by UNT to grow our faculty base and research productivity in STEM departments. Increasing Ph.D. productivity and investment in STEM programs is a priority. We will accelerate the relatively modest increases realized to-date by targeting at least one third of doctoral degrees awarded to be in STEM fields by 2020. As indicated below, this will be accomplished near-term by graduating current students who have been in programs for an extended period of time, supporting enrollment increases in Biology and Chemistry beginning in Fall 2010, and ensuring timely graduation in all STEM programs. Increased STEM Ph.D. production will be sustained through enhanced quality of existing programs, targeted enrollment increases, budget reallocations and new Ph.D. programs in Biomedical Engineering, Electrical Engineering, Mechanical and Energy Engineering and Pharmacology.

IV.1.d. Investment and Consolidation

Achieving our near and longer term degree productivity goals will require focused investments in high quality graduate programs which also support our research objectives. An overview of plans for each college is presented below.

IV.1.d.i. College of Education. The Ed.D. degrees within the College of Education have traditionally served working education professionals and students planning non-academic careers. The College has provided an important service to the education profession in the North Texas region through the currently

offered Ed.D. and Ph.D. degrees. However, the portfolio of 11 doctoral degrees no longer aligns with the research goals of the college and the university. We plan to consolidate six of the degrees, including three of the Ed.D. degrees, into one Ph.D. program with concentrations. This will place a greater emphasis on research and will increase the percentage of full-time graduate students in the college. Through targeted recruitment and increased financial support, enrollment in the new Ph.D. program is anticipated to match and possibly exceed the previous combined enrollment in the Ed.D. and Ph.D. programs.

IV.1.d.ii. College of Music. The College of Music is internationally known for excellence in music performance, particularly in jazz studies. The College has graduated an average of 34 D.M.A. and six Ph.D. students annually over AYS 2006 through 2008. These students have gone onto successful performance and academic careers, adding to the renown of our College of Music. The core strength of the college is preparing students for performance careers which do not necessarily require an advanced degree. However, the D.M.A. in Composition is a high quality program of value to a professional career in music composition. We plan to convert the D.M.A. to a Ph.D. degree to better align the perception of the degree with its quality. We anticipate no enrollment loss in this conversion.

IV.1.d.iii. College of Business. The College of Business awards six Ph.D. degrees – Accounting, Business Computer Information Systems (BCIS), Finance, Management Science, and Marketing. Over the last few years, enrollment in the Ph.D. programs was restricted in response to the College’s most recent accreditation review. This has resulted in decreased degree productivity in all of the College’s Ph.D. programs, and particularly low productivity in Accounting and Management Science. We plan to merge the Management Science degree with the Business Computing and Information Science degree to form a single Ph.D. in Information Systems and Decision Sciences with multiple concentrations. This will address the low productivity in Management Science. It will also provide an opportunity to focus resources and grow enrollment in a program that has high business demand. We are considering a range of options for the other Ph.D. degrees in the college – including closing some programs.

IV.1.d.iv. College of Arts and Sciences. The College of Arts and Sciences (CAS) has the highest enrollment and greatest doctoral production across UNT colleges and schools. It will remain the core academic unit in the university. We will increase investment in its high quality programs to sustain and increase Ph.D. production. Specifically, we will:

- Sustain Ph.D. production in Psychology at approximately the current level
- Increase productivity in Biology, Chemistry and Physics by enhancing program quality and allocating additional centrally supported graduate student lines
- Disinvest in, and phase out, low producing and low priority programs and units
- Maintain current graduate resources in English and Philosophy to ensure a balanced “portfolio” of graduate degrees
- Enhance quality in all programs as described below

IV.1.d.v. School of Merchandising and Hospitality Management (SMHM). The School of Merchandising and Hospitality Management offers masters degrees in Hospitality Management and Merchandising. An innovative international master’s program in Sustainable Tourism is pending THECB approval. While the SMHM graduate programs have a solid international reputation, investment in new graduate programs will not yield major achievements in research productivity.

IV.1.d.vi. College of Engineering. The College of Engineering is a key component to achieving our research objectives. The College currently has two Ph.D. programs – Computer Science and Engineering and Materials Science and Engineering. The quality of both these programs will be enhanced to decrease attrition and increase degree productivity. This will be achieved through improved management and additional resources to support recruitment and retention of full time doctoral students. In addition to enhancing the quality of existing doctoral programs there is an initiative to close programs in Engineering Technology, reallocating resources to new Ph.D. programs in Mechanical and Energy Engineering, Electrical Engineering, and Biomedical Engineering

IV.1.d.vii. College of Visual Arts and Design. The College of Visual Arts and Design has highly regarded master's and M.F.A. programs. The college also offers a Ph.D. in Art Education. The Department of Art Education and Art History has been rebuilding to enhance its faculty and research productivity. We will continue to review the program's contributions to the college's and university's strategic objectives.

IV.1.d.viii. College of Public Administration and Community Service. The College of Public Administration and Community Service plays a central role in UNT's efforts toward *Closing the Gaps*. The college offers a variety of master's programs, including a highly ranked master's of Public Administration. The college offers Ph.D. degrees in Sociology and Public Administration and Management. An area of strong potential currently within Public Administration and Management is emergency and disaster management. There is a plan to increase investment in this area, and we are reviewing the best alignment of the enhanced program within a planned reorganization of the college.

IV.1.d.ix. College of Information. Ph.D. programs in the College of Information contributed more than 15 percent to UNT's Ph.D. production from AYs 2004 through 2008. We will sustain the number of degrees produced by the college while achieving a degree distribution more aligned with our research objectives (e.g., increasing degrees in the sciences and engineering). We will also address the high attrition rate in the Learning Technologies Ph.D. program through greater emphasis on graduate student mentoring in the annual faculty review and merit process.

IV.1.d.x. School of Journalism. The School of Journalism was founded as a separate school in 2009. It currently offers a Masters of Arts and a Masters of Journalism degree. The school has an international reputation in the field of narrative journalism and its graduates realize distinguished careers in the media industry. There are no plans to create a doctoral program in the school at this time.

IV.1.e. Achieving Productivity and Quality Enhancement Goals

Reaching our doctoral degree productivity goals will require sustained quality enhancement of all of our programs. Strong programs will continue to rise to national prominence and resources will be allocated away from programs not achieving quality benchmarks. Strategies for achieving productivity and quality goals include those outlined below.

IV.1.e.i. Targeted Enrollment Increases and Recruitment. We will increase the number of centrally supported graduate assistantships and tuition scholarships in Ph.D. programs by 10 percent over the next five years. The additional graduate student support will be focused in programs aligned with our research objectives and targeted faculty hires. The assistantships and tuition support will be funded through a

combination of revenues derived from enrollment and tuition increases and from resources reallocated from low-producing graduate programs.

To ensure intentional graduate student recruiting across the university and, particularly, in our targeted research areas, all doctoral programs are being required to develop formal recruitment plans by April 2010. These plans will provide goals for improving the quality profile of applicant and matriculated pools, specific recruitment activities and venues, and resources dedicated to and needed for recruitment efforts. The plans will also include specific strategies for improving retention and time to graduation. Achievement of recruitment, retention, and graduation benchmarks established through the plans will be an essential component in program review and future resource allocation.

Recruitment activities will be coordinated with our efforts to increase international collaborations and visibility. The UNT International Office is strategically allocating resources to recruit top students from targeted countries, including India, China, Korea, Taiwan, Thailand, Nepal, Vietnam, Turkey, Mexico, and Israel. Our selective international recruitment activities are building upon successful existing relationships as well as developing new networks with organizations and foreign universities that promise high yield with high quality students. We are enhancing our operational practices and financial support levels to be responsive to the expectations of top international students, ensuring that contacts yield enrollment.

IV.1.e.ii. Competitive Compensation Levels. UNT raised graduate student stipends across the university in AY 2009. The stipends were benchmarked to the average stipends stated in the Oklahoma State Graduate Assistant Stipend Survey of 42 research institutions. Universities in the study include UNT aspirational peers. We will review stipend levels annually to ensure competitive recruitment and retention of top graduate students, particularly in STEM fields and other high achieving areas.

IV.1.e.iii. Fellowships. We have created a pool of centrally funded graduate fellowships to attract top students to UNT Ph.D. programs. The fellowships comprise multi-year stipend, tuition and health care support. We will continue to grow the number of the fellowships both centrally funded and through private/corporate endowments.

IV.1.e.iv. Timely Graduation. Achieving our near-term degree production goals set for 2015 will depend primarily on graduating current students and students entering doctoral programs within the next two years. Several of our Ph.D. programs have strong student mentoring and timely graduation traditions. However, across many programs, there are students who have stalled in their degree progress. To address this:

- Doctoral students will be eligible for university-supported graduate assistantships for a maximum of six years under the new graduate student compensation/employment structure implemented this year.
- Beginning Fall 2010, all doctoral students who have currently been in programs for extended periods of time will be required to submit evidence of progress and a plan for completing their degree within 18 months, or they will be dropped from their program.
- Doctoral programs with proportionally high numbers of students not making timely degree progress are being reviewed with respect to the number of funded graduate student lines allocated to the department and whether the programs should be continued.

IV.1.e.v. Research Grants. All external funding proposals are now required to adhere to student stipend levels set by the UNT Graduate School and to include student tuition support when allowed by the granting agency. By 2015, UNT plans to increase the numbers of doctoral students supported by research grants by 50 percent; by 2020, the targeted increase is 100 percent.

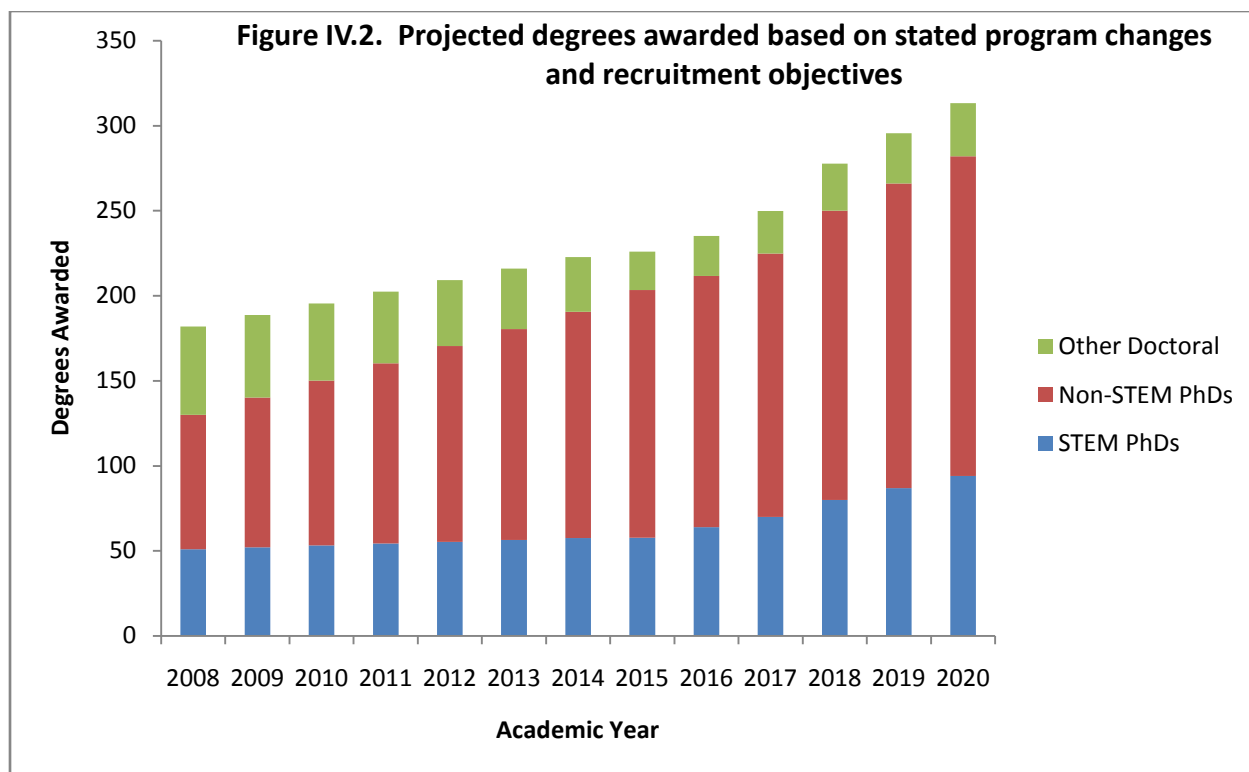
IV.1.e.vi. Program Assessment. Outstanding research universities have outstanding graduate programs. Achieving and sustaining top quality graduate programs requires regular evaluation with respect to outcome metrics. UNT recently revised its Academic Program Review (APR) process to be more tightly focused on the need to make evidence-based strategic decisions. The new process requires all academic units, regardless of discipline-specific accreditation, to submit an APR report every seven years. The review evaluates each program's curriculum, operation, productivity, and resources relative to the university's mission and strategic priorities. The review includes comprehensive evaluation of graduate programs following the metrics defined by the THECB *18 Characteristics of Doctoral Programs*. We are also adding context to these metrics to allow informed interpretations, employing national level data such as from the Carnegie Ph.D. Completion Project.

APR reports will be submitted to the appropriate academic dean. The dean will determine whether a review by external evaluators is necessary. If so, a second level of review will be performed involving a campus visit by a three-person external committee. This two stage process is designed to avoid unnecessary external reviews and the typical recommendation of "more space and more faculty" when there is departmental and administration consensus on program status. We will also be employing third-party data sources to provide objective quantitative evaluation of faculty scholarly productivity benchmarked to national and peer standards.

Programs can change dramatically over a seven-year review window. Our ambitious research objectives will require yearly resource allocations and, possibly, reallocations to/from programs. It is essential that these allocations be based on timely, accurate program reviews. In addition to the periodic APRs, we are implementing a yearly Program Profile process. This process will be data driven, providing a yearly snapshot and trend analysis of each doctoral program. Evaluation metrics will include faculty and graduate student productivity, characteristics of doctoral program applicants, student success metrics (retention, degree progress, graduation and job placement), grant and fellowship support, and program costs. Program profiles will be compiled through existing centrally collected data, minimizing dependency on department resources. The Program Profile process will be initiated in Fall 2010.

APR reports and yearly Program Profiles will be part of a continual process of program review. Low-producing programs, programs not meeting quality expectations, and programs not aligned with university strategic objectives will be considered for discontinuation or consolidation. For example, doctoral programs below national norms for retention and graduation rates will be strong candidates for discontinuation/consolidation.

IV.1.e.vii. Creation of New Ph.D. Programs. As described below, we plan to develop four new Ph.D. degrees within the next five years. This, combined with the other graduation and completion rate initiatives described above, will allow UNT to achieve the rate of doctoral degree production depicted in Figure IV.2.



IV.2. New Doctoral Programs

The planned new Ph.D. programs are integral to our strategic research objectives. Three programs will be in the College of Engineering – Biomedical Engineering, Electrical Engineering, and Mechanical and Energy Engineering. One program – Pharmacology – will initially reside across the Biology and Chemistry departments of the College of Arts and Sciences.

Pharmacology and Biomedical Engineering will build upon existing faculty strengths and allow more competitive pursuit of research funding in health and medicine. The Biomedical Engineering Ph.D., with a particular focus on biomechanics, will be created within a new department of Biomedical Engineering. Electrical Engineering and Mechanical and Energy Engineering Ph.D.s will be developed within currently existing departments.

IV.2.a. Electrical Engineering Ph.D.

The development of an Electrical Engineering (EE) Ph.D. will complement and enhance the existing EE and Computer Science and Engineering (CSE) departments. Our EE department currently offers B.S. and M.S. degrees. Faculty in EE and CSE have strong research programs in sensor networks, communication and signal processing, computer vision, very large-scale integration (VLSI) design, and environmental monitoring supported by NSF, Army Research Laboratories and industry funding. Several EE faculty have joint appointments with the CSE department to allow mentoring of Ph.D. students. Five of these Ph.D. students have advanced to candidacy with four more students beginning course work. Establishing an EE Ph.D. program will allow faculty to expand their research programs and funding levels, attracting dedicated doctoral students pursuing degrees in the program. An EE Ph.D. program will provide students in the existing engineering graduate programs opportunities to work in exciting research areas not

currently covered, as well as attract new students and faculty hires to already solid interdisciplinary research teams working in device fabrication, sensor fusion and networks, actuators, VLSI and security.

According to the U.S. Bureau of Labor Statistics, the employment of electrical and electronic engineers is projected to increase from 301,500 in 2008 to 304,600 in 2018. Employment of computer hardware engineers, who generally hold electrical or computer engineering degrees, is projected to increase from 74,700 in 2008 to 77,500 in 2018. The Institute for Electrical and Electronic Engineers (IEEE) projects a growth of 18,600 jobs in electrical, electronic and computer hardware engineers over the period from 2006 to 2016. Similar projections for Texas indicate a positive trend with a projected growth from a base of 13,710 in 2000 to 15,340 in 2010 for electrical engineers. The need for electrical engineers is expected to be even greater in the DFW region with its growing population and high-tech business sector. Sustaining technology innovation requires the high-level talents developed through Ph.D. training in EE.

Two public universities in the DFW region – UT Dallas and UT Arlington – currently offer EE Ph.D. degrees, annually graduating about 15 and 11 students, respectively. The proposed UNT program will focus on training and research not covered by the UTD and UTA programs. The UTD EE program emphasizes research in telecom and VLSI areas and UTA program provides training in general EE areas. The proposed UNT program will emphasize research in power-aware electronics, radio frequency (RF) electronics, sensor systems, and bio-electronics. These research emphases are driven by existing faculty expertise and potential for research collaborations with defense companies in the region, such as Lockheed Martin and Raytheon.

IV.2.b. Mechanical and Energy Engineering Ph.D.

Our Mechanical and Energy Engineering (MEE) department (the only engineering department in the U.S. with the focus of *energy* reflected in its name) currently offers BS and MS degrees. MEE faculty have established research records in nanotechnology, thermal fluids, nuclear energy and air quality modeling. Their research is funded by NSF, Department of Defense, Texas Commission on Environmental Quality and local industries. The undergraduate MEE program is the fastest growing program in the College of Engineering. This growth is indicative of unmet demand in Texas for MEE training at both the undergraduate and graduate levels. The development of a MEE Ph.D. will help meet this need and significantly enhance faculty research capacity.

The Texas Workforce Commission projects employment of mechanical engineers will increase from 16,000 in 2006 to 18,900 in 2016. The need for mechanical engineers is expected to be greater in the Dallas-Fort Worth and Houston regions with expanding engineering operations supporting the energy and industrial sectors. More than a third of all mechanical engineers in the state are employed in the DFW and Houston areas.

One public and one private university in the DFW region – UTA and SMU – currently offer mechanical engineering Ph.D. degrees. The proposed MEE program at UNT will focus on innovative training and research not provided by the SMU and UTA programs. The SMU program emphasizes research in manufacturing, robotics, biomedical, solid mechanics and thermal sciences, while the UTA program provides research and training in aerospace, robotics, MEMS, CAD and materials. The proposed UNT program will emphasize research in the broad areas of energy, thermal fluids, environment and materials. The latter research emphases align with current faculty expertise and meet the needs of regional and state industries.

IV.2.c. Biomedical Engineering Ph.D.

We plan to create a Department of Biomedical Engineering (BME) in the College of Engineering. Initially only graduate degrees – Ph.D. and M.S. – will be offered. Beginning the program with graduate programs allows immediate contributions to university research objectives as founding faculty are hired without undergraduate teaching requirements. The BME program will actively collaborate with our Biology and Chemistry departments, as well as with the UNT Health Sciences Center (HSC). HSC faculty and administrators have already pledged to make courses and labs available to UNT BME students. The proposed degree program will include one semester of study at HSC for M.S. students and one year study at HSC for Ph.D. students. This will be similar to the current collaboration between UNT and HSC for our Clinical Psychology program. The BME program will complement our planned Pharmacology degree, providing synergies in emerging medical technology research.

The potential for a BME program was recently evaluated by four external consultants. Their positive recommendation noted existing research strengths in Engineering, Biology, Chemistry and the HSC on which to build the new program and the significant opportunities for increasing research funding. Nationally, BME faculty receive funding from traditional engineering sources (NSF, DoD, NASA) and from NIH and Veteran Affairs. The NSF reports that university research expenditures in Biomedical Engineering increased more than 309 percent between 2000 and 2007, compared to increases of 149 percent in Electrical Engineering, 160 percent in Materials Science and Engineering, 162 percent in Computer Science, and 158 percent in Mechanical Engineering (the latter are current programs in the UNT College of Engineering).

A BME program will have a direct economic benefit to the region. Bioengineering is a transitional research area, where basic research transitions quickly to health care applications. Research conducted at UNT in BME is expected to result in technology commercialization faster than research in other engineering disciplines. The Texas Healthcare and Bioscience Institute (THBI) reports that 2,900 patents were filed by Texas medical device and biomedical research companies from 2003 through 2007. Moreover, the THBI 2009 report “Texas Life Sciences Industry Profile” indicates that Texas biomedical companies employed 50,000 people in 2008 with an economic impact of \$28 billion, an increase of 22 percent over 2003. More than 200 medical device companies and 570 biomedical engineering companies are in the DFW region according to the Health Industry Council. Thus, the BME program will supply graduates who are in demand in North Texas and increase the opportunities for UNT to contribute to the innovation economy of the region and state.

IV.2.d. Pharmacology Ph.D.

As part of our plans to establish a UNT College of Pharmacy, we will develop a Ph.D. in Pharmacology. Depending on the timing of the establishment of the College of Pharmacy, the Pharmacology Ph.D. may initially be offered through the Biological Sciences department. Developing a College of Pharmacy and a Pharmacology Ph.D. contributes to our strategic objective of increasing funded research in health-related fields.

The College of Pharmacy will build upon existing strong undergraduate and graduate programs in the Departments of Biological Sciences and Chemistry, particularly in the areas of biochemistry, molecular biology, physiology, and computational chemistry. UNT’s doctoral degree programs in Biology, Biochemistry, Molecular Biology, and Chemistry will provide immediate collaborations for pharmacy faculty hired. The addition of a pharmacy faculty will provide current faculty opportunities to expand

research programs from their current focus on basic research, with an NSF funding base, towards an applied NIH and industry base.

UNT currently has the faculty and facilities in its Departments of Biological Sciences and Chemistry necessary for students to complete the first two years of the pre-pharmacy curriculum outlined by the Accreditation Council for Pharmacy Education, and to award pre-pharmacy advisees bachelor's degrees in Biology, Biochemistry, or Chemistry. Approximately 12 additional faculty members will be needed to establish two departments – Pharmacy Practice and Pharmaceutical Sciences – to cover the professional Pharm.D. curriculum and offer a Ph.D. in Pharmacology. The Department of Pharmaceutical Sciences faculty will be responsible for basic clinical and wet lab sciences instruction in biochemistry, physiology, pharmacology, medical chemistry, pharmaceuticals, pharmacokinetics, pharmacodynamics, pharmacogenomics, molecular biology, genetics, and immunology. The Department of Pharmacy Practice faculty will be responsible for the Ph.D. in Pharmacology. Because a Pharmacology Ph.D. depends more on research faculty than pharmacy practice, we will consider staging the hiring to be able to establish the Pharmacology Ph.D. before the new college is fully staffed.

The National Pharmacist Aggregate Demand Index (ADI) estimates the balance between supply and demand for pharmacists in the U.S. The ADI is expressed as a number between 1 and 5 – with higher numbers indicating greater need. The overall demand in the U.S. is 3.88. The demand in Texas is 4.38, behind only California, Kentucky and North Carolina. DFW is the largest metropolitan statistical area without a pharmacy school. A UNT College of Pharmacy will address the shortage of health care professionals in Texas and the growing population of the DFW region. Our goal is to build a research intensive pharmacy program. The Pharm.D. and Pharmacology degrees will enable the program to address state and regional health care needs as well as train pharmaceutical scientists to contribute to biotechnology innovation, a strategic area of economic development for the North Texas region.

Summary of Plan for Doctoral Programs

- UNT will continue to provide comprehensive graduate education in more than 150 graduate programs.
- UNT will award 200 Ph.D. degrees annually by 2015. By 2020, UNT will award approximately 300 doctoral degrees annually, with at least 90% Ph.D. degrees.
- Our doctoral productivity goals will be achieved by:
 - Sustaining productivity of our current high quality programs through allocation of additional graduate student and faculty resources
 - Enhancing the quality and productivity of programs through outcome-based investment
 - Establishing new doctoral programs in targeted STEM areas
 - Reallocation of resources from low-producing programs not aligned with UNT strategic objectives
 - Aggressive recruitment and retention of high quality graduate students both domestic and internationally
- UNT will continue to increase funding for graduate stipends by identifying additional funds for fellowships and assistantships, and by including tuition and fees for research assistants on external grant proposals.
- UNT will increase the number of doctoral students funded by research grants 50 percent by 2015, and 100 percent by 2020.
- UNT's graduate programs will increase in national and international recognition for their high quality, emphasizing our growing strengths in STEM research and strong traditions in the performing arts, humanities and teacher education.

V. PLAN FOR FACULTY AND STUDENT DEVELOPMENT

V.1. Faculty Research

UNT is committed to fostering and developing its faculty to help them reach their full potential as teachers and scholars. In particular, the university is implementing multiple programs to help faculty at all levels to succeed in developing research collaborations and in acquiring external funding for their research and scholarly endeavors. The university is also implementing programs to systematically promote its high achieving faculty for national and international awards.

V.1.a. Research Development Team

Over the past two years, the Office of Research and Economic Development has assembled a Research Development Team (RDT) and pre-award grants officers with the ability to provide high-level service to researchers seeking grant funding. RDT members include individuals with extensive experiences at the National Institutes of Health, at the National Science Foundation, and at other research institutions. This team of professionals provides faculty with a wide range of services. One RDT service involves helping faculty identify funding sources relevant to their research expertise. In addition to training the faculty in how to monitor likely funding agencies for announcements and requests for proposals, the RDT collects funding information and then distributes it to targeted faculty whose expertise aligns with the funding opportunity. The RDT also organizes and conducts a broad range of workshops and seminars on topics related to effective grant-writing. Perhaps the two most critical services provided by the RDT are personalized proposal review and personalized strategic fund-seeking assistance. RDT members work one-on-one with faculty researchers (1) to maximize the likelihood that each researcher will identify appropriate sources of support, and (2) once a grant program identified and targeted, to ensure that the submitted proposal is as competitive as possible. The Office of Research and Economic Development plans to continue offering the services of the RDT and, as demand and volume grows, strategically expand the RDT.

V.1. b. Scholarship, Creativity, Doctoral Production versus External Funding

As noted earlier, UNT believes in research, scholarship, creativity, and innovation across the broad spectrum of its academic disciplines. UNT emphasizes overall faculty productivity, including their contributions and recognitions within their disciplines, and doctoral graduate production (or terminal degree production in areas without the doctorate). In concert with this philosophy, the Office of Research and Economic Development (ORED) assists faculty from all disciplines in garnering external support, regardless of the size of the grant or contract, and regardless of the proportion of indirect cost allowed by the sponsor. ORED also works very closely with the Office of Advancement to pursue funding from non-profit organizations, foundations, and individual donors. Additionally, ORED and the Office of the Provost partner to provide internal grant support for research and creative endeavors in all areas.

V.1.c. Training in Research Ethics and Compliance

In addition to the workshops presented and/or coordinated by the Office of Research and Economic Development to help faculty develop their grant-writing and fund-seeking skills, a variety of other professional development opportunities are provided to help faculty and graduate students stay abreast of ethical and compliance-related knowledge in the conduct of research. Training opportunities are currently offered or being planned for the responsible conduct of research, general research ethics, human subjects

(IRB), animal care and use (IACUC), biohazards, laser safety, conflict of interest, effort reporting, and export controls.

V.I.d. Seed Funding

A variety of seed grant and small grant programs are operated by the Office of Research and Economic Development, some in cooperation with the Office of the Provost and Vice President for Academic Affairs. UNT plans to continue these programs during the timeframe of the current strategic plan for research.

The **Research Initiation Grant (RIG)** is intended to stimulate and aid (1) faculty members at the beginning of their academic careers or (2) faculty members seeking to rekindle their research efforts by undertaking research projects that will establish or reestablish their involvement and expertise in a given area of inquiry or activity. The **Research Opportunities Program (ROP)** provides assistance to university research and scholarly activities that show a high potential for attracting and maintaining support from external funding agencies. The **Research Enabling Grant (REG)** enables faculty members to carry out high quality research and scholarly activities in areas for which external funds are demonstrated to be unavailable. RIG, ROP, and REG awards are limited to \$7,500 budgets for one year or less; competitions are held annually.

The **Research and Creativity Enhancement (RCE)** award supports selected tenured faculty in the liberal arts and fine arts to enhance their research, scholarly, and/or creative endeavors. To compete for the annual award of up to one-month's summer salary and \$3,000 travel/project expenses, an applicants must be a full-time, tenured faculty member with the rank of Associate Professor or Professor whose scholarly discipline is in the arts or humanities.

The **Junior Faculty Summer Research Fellowship** provides \$5,000 in summer salary support for selected faculty early in their academic careers to enable them to concentrate on research activities during summer months. This annual competition is open only to junior faculty.

Small Grant awards (\$1,000 or less) allow researchers to meet unexpected research costs that arise during the academic year, and that are not viable as ROP, RIG, or REG submissions. **Pursuit of Extramural Support Travel (PEST)** awards assist researchers with travel to funding agencies and provides funds to bring program officers or other funding agency personnel to UNT. Applications for Small Grants and PEST awards are accepted year-round.

In the past two years, the Office of Research and Economic Development has sponsored periodic competitions for supporting needed research **infrastructure** such as equipment, space renovation, and other re-useable research resources. The need for additional infrastructure competitions will be monitored, based on the types of grant awards obtained and equipment shortfalls noted by researchers, chairs, and deans. If needed, additional infrastructure competitions will be held.

Investigators occasionally have research-related funding needs as **cost-sharing** for an external grant proposal, or funding needs that are not associated with a grant proposal and do not fall within one of the normal internal funding mechanisms described above. The Office of Research and Economic Development has an explicit procedure for faculty researchers to request such funds in partnership with their chair and dean, and plans to support as many viable requests as resources will allow.

V.1.e. Infrastructural Improvements

As described in more detail in Section VI, a number of capital infrastructure projects are underway and planned that are intended to be utilized by a variety of researchers across disciplines. Infrastructural needs specific to individual researchers are met by start-up packages, external grants (e.g., awards from NSF Major Research Instrumentation program), and special requests (described above). UNT plans to improve its research infrastructure in all of these ways (general facilities as well as faculty-specific equipment and laboratories), primarily via the hiring plan and start-up packages described in Section II and the capital projects detailed in Section VI.

V.2. Faculty Recognition

V.2.a. National and International Awards

UNT already has many nationally and internationally recognized faculty, such as a National Academy of Engineering member, Grammy nominees, National Carnegie Foundationa Scholars, NSF CAREER awardees, and a winner of the Presidential Early Career Award for Science and Engineering (PECASE). As the university pursues its plan to hire large numbers of high level, research-oriented faculty who are already leaders in their fields, the number of faculty members with potential for national and international awards will increase. The university already has a highly successful office to assist students seeking national awards (e.g., for Rhodes, Marshall, Fulbright, Truman, Goldwater, and Udall scholarships and awards). UNT plans to put in place a similar program to promote faculty for national and international recognitions and awards. Not only will this help bring acclaim to UNT's highly accomplished faculty who might otherwise be overlooked, but it will bring acclaim to the institution and to the region.

V.2.b. Named Professorships

UNT has several named professorships to recognize outstanding faculty members. These awards include the designated title as well as a one-time supplement added to the recipient's base salary.

The ***Regents Professorship*** recognizes individuals at the rank of professor who have performed outstanding teaching, research, and service to the profession, and who have achieved a high level of national and international recognition.

The ***University Distinguished Research Professorship*** recognizes tenured faculty at the rank of professor who have achieved an exceptionally outstanding record of creative activities or research productivity and who demonstrate a record of continued extraordinary productivity.

The ***University Distinguished Teaching Professorship*** recognizes tenured faculty who perform outstanding teaching, teach at the introductory levels of their disciplines, promote the continuous development of teaching excellence, and promote improved teaching among their colleagues in the UNT community.

UNT plans to aggressively solicit funds to create more endowed Chair positions and named professorships (see Section VI.4).

V.3. Collaborations and Partnerships

V.3.a. Team-Building Assistance

The RDT (described in detail above) will promote collaborations and partnerships by functioning as the coordinators of team-building efforts associated with major collaborative funding opportunities. RDT members will identify relevant areas where collaborative teams would be beneficial to UNT, identify and assemble the team members, and offer proposal development assistance to collaborative teams that coalesce into a fund-seeking initiative.

V.3.b. Inter-Institutional Seed Programs

In addition to the seed fund programs for UNT faculty, UNT plans to leverage emergent partnerships with collaborating institutions by offering joint collaborative seed-funding competitions. Recent such competitions have been jointly conducted with the UNT Health Science Center and with the Autonomous University of the State of Mexico. These competitions reinforce the importance of collaborative efforts, and afford opportunities of faculty at both institutions to pursue research in which their respective areas of expertise are maximally complementary.

V.4. New Faculty

The hiring plan that forms the basis of this strategic plan to increase research funding is outlined in detail in Section II. Faculty brought to UNT through this hiring plan will form the nucleus of new faculty conducting research in areas for which external funding is readily available.

Other new faculty (via replacements positions) will be recruited to UNT during the timeframe of this strategic plan as a means to strengthen those programs that significantly contribute to UNT's *Closing the Gaps*, and those programs that have already achieved nationally recognized levels of excellence.

V.5. Student Awards

Initiatives to increase the number and prestige of undergraduate and graduate student competitive research awards will be implemented through the joint efforts of the Toulouse School of Graduate School (TSGS), the Office of Research and Economic Development, and the Office for Nationally Competitive Scholarships (ONCS). Particularly noteworthy programs include the graduate student professional development workshop series, the Graduate Student Research & Fellowship Support Program, and the undergraduate Scholar's Day conference and research journal, the *Eagle Feather*.

ONCS provides a campus-wide service of identifying nationally competitive scholarships, alerting programs and colleges to apply for them, and supporting students and their mentors through the application process. Students may be selected through competition, faculty nomination, or student self-nomination. Support for applicants includes multiple revisions of draft documents, mock interviews, and final application submission. This program has been highly successful. For example, UNT is among only a handful of universities in the country (and the only university in Texas) to routinely receive the maximum of four Barry M. Goldwater scholarships per year for outstanding undergraduates planning to pursue careers in mathematics, science and engineering.

The Graduate Student Research & Fellowship Support Program seeks to increase the number and quality of extramural proposals submitted by graduate students in support of research and graduate study at UNT. This program equips students with skills needed to apply for prestigious research grants and fellowships

(such as NSF and NIH). After a campus-wide competition, selected students receive intensive proposal-writing training (~12 hours) and participate in a cross-disciplinary process along with a cohort of approximately 20 other students. Each student receives guidance and counsel from a team of UNT experts in preparing and successfully submitting a proposal to a funding agency. Students who successfully complete the training and submit their proposals receive recognition and a cash award. Other graduate students may apply and participate in the training and mentoring to polish their research proposal development skills without the cash award.

As part of the professional development workshop series for graduate students, TSGS provides workshops to equip students with planning, resilience, engagement, and professionalism skills through different stages of their academic life. Each semester topics covered include responsible conduct of research, grants and fellowships, and research and conference presentation skills. Skills acquired in these workshops encourage and assist students to compete for awards and scholarships.

For undergraduate students, the UNT Honors College sponsors an annual university-wide Scholars Day conference where undergraduates present research they have completed under a mentor in oral and poster presentations. Awards are presented to winners in several categories. The Honors College also publishes an undergraduate student research journal, the *Eagle Feather*, where the best of these papers are published.

V.6. Development of a Diverse Student Body

Part of successful student development is the immersion into a diverse student body to sensitize and inform students to the cultural contexts of their academic knowledge and its societal application. Such development is only possible for students if the academic institution has effectively recruited a diverse representation of students. UNT's recruiting efforts to attract desirable doctoral candidates include representation at national conferences aimed at under-represented groups, offering competitive funding packages, and reviewing recruiting strategies and best practices.

One direct recruiting activity includes the annual Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) national conference. This conference offers the opportunity to speak directly with high achieving students in STEM areas and recruit them to UNT.

Another direct recruiting opportunity UNT will continue to utilize is its connection with students in the McNair program. These students are directed specifically to doctoral education and success. The many regional McNair conferences allow UNT to recruit the students who are part of under-represented groups that are prepared to bring research experience to UNT.

In addition, utilizing various recruiting techniques such as national name exchange and other purchased lists will result in locating highly sought after students in populations that will enhance UNT's progress toward its goals in *Closing the Gaps*. The Lone Star Diversity Colloquium is another recruiting opportunity developed especially for Texas institutions to educate certain groups about the opportunities in graduate education. UNT participates in all of these recruiting events annually.

Competitive funding packages are a key element in recruiting top students to UNT. By providing assistantships and scholarships in key disciplines, recruitment becomes more flexible. Thus, programs are able to obtain commitments from highly sought after students. Continuing such investment is key to success in UNT's goal of achieving national research university status.

Continual review of recruiting strategies and best practices will result in broadening opportunities for locating highly sought after students, holding direct recruiting events, and improving communication of UNT's programs and research successes.

Faculty and Student Development

UNT plans to build and expand multiple programs to help faculty and students reach their full potential to earn the highest levels of recognitions, awards, and prizes:

- Creation of a professional team to assist faculty in finding and pursuing external funding
- Development of an extensive workshop and training program on a wide-range of topics related to research
- Development and expansion of various seed funding programs to promote individual and collaborative research
- Creation and expansion of multiple programs to recruit students with diverse backgrounds to UNT and then to support them after they join UNT
- Creation of programs to assist students and faculty in pursuing national and international recognition for their achievements

VI. OTHER RESOURCES

VI.1. Allocating, Optimizing, and Expanding Research Facilities

Implementing the research plan described here will require expansion of state-of-the-art research infrastructure. This includes increased laboratory space, upgrade and expansion of equipment, and expansion of support services. UNT is already making strides in this process. Each of these areas is described below.

VI.1.a. Research Space

VI.1.a.i. Existing Research Space. For the past decade, UNT has been steadily expanding and upgrading research facilities. The current expansion process began with the construction of the new Environmental Education, Sciences, and Technology building (completed 1998) and a new Chemistry building (completed 2005), and continued with the purchase and ongoing build-out of the Discovery Park. Discovery Park is a former Texas Instruments facility located five miles from the main campus on 290 acres. UNT purchased the acreage and the building which now houses the Colleges of Engineering and Information, as well as other non-academic units. Not only did these new facilities provide new space, but they also included better quality space designed specifically for research. This includes vibration-isolated areas for vibration sensitive equipment, low particulate labs, and significantly expanded cooling and power for large computing facilities. An important ongoing phase of this research facility expansion is the soon-to-be-completed Life Sciences Complex (described in more detail below).

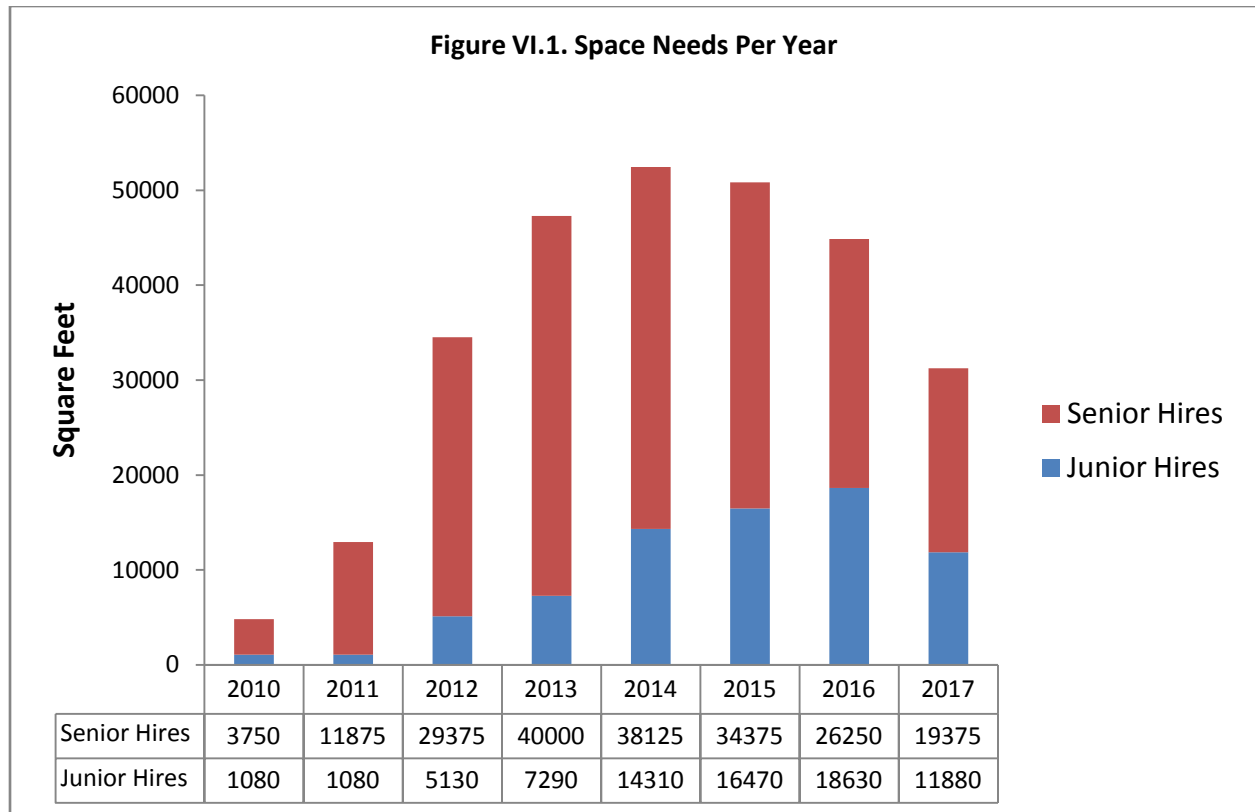
Presently, the vast majority of research laboratories reside in the following “science and technology” buildings:

- Chemistry
- Environmental Education, Sciences, and Technology (EESAT)
- Biology
- Discovery Park
- Science Research Building (SRB)
- Physics

It should be noted that the EESAT building houses only a few laboratories; it contains mostly offices and classrooms associated with the theme of environmental science. Also, the SRB and the Physics building are UNT’s oldest science and technology buildings, and both are in need of significant renovations in order to bring the laboratories up to state-of-the-art levels. With the possible exception of Discovery Park, these facilities are filled to near-capacity with UNT’s current research faculty. Thus, in order to carry out the hiring plan proposed in this strategic plan, solutions must be devised to further rapidly expand research space.

We estimate that at least 300,000 ft² of research space will be needed to accommodate these researchers. Figure VI.1 shows the projected space needs per year to accommodate the research faculty to be hired. Given that many of the new hires will be replacement positions, some space will be made available from the vacant positions. However, in laboratory-based disciplines, the space needs of these research-intensive faculty are likely to exceed the space utilized by previous faculty (who might or might not have been in the same department or discipline). Because many laboratories will need to be renovated, equipment purchased, and facilities consolidated for joint use as a part of this process, the space

projections for each hire are phased in over a three-year period (half of the projected need in year one, one-fourth in year two, and one-fourth in year three).



VI.1.a.ii. Securing Research Space. Securing and assigning appropriate research space is critical to this plan so that research faculty in the targeted areas will be able to carry out their work. The needed space will be made available by a combination of (1) assigning space associated with vacant faculty positions; (2) renovating and reallocating current facilities; and (3) new construction. New construction has both near-term and medium-term components with associated renovation/reallocation components.

The new Life Sciences Complex is slated to begin housing researchers in Fall 2010. Located adjacent to the existing Biology Building, this new building adds 87,000 ft² of additional space for research and optimizes use of research tools by aggregating them into multi-user laboratories easily accessible to a larger number of researchers, many of whom will be hired as part of this strategic plan as well as current faculty who will be vacating space in other buildings that can be renovated for new researchers. This will create approximately 40,000 ft² of space in the Science Research building (SRB) as well as another 10,000 ft² in other buildings around campus that can be renovated and allocated to the planned hires.



UNT Life Sciences Complex. Photo taken: 3/12/2010

A new Business Leadership Building is currently under construction, with planned completion set for 2011. Given research emphases that include units within the College of Business, approximately 40,000 ft² within that new building will be allocated for research initiatives. The completion of the Business

Leadership Building will create a domino-effect of renovation/reallocation process in the building previously occupied by the College of Business. Thus, an additional 40,000 ft² of space can be recovered in the medium-term following renovations.

Discovery Park continues to be renovated to create laboratories and other research facilities. An additional 20,000 ft² of space within Discovery Park will be allocated to the new hiring initiatives.



Artist's Rendering of UNT's Business Leadership Building



UNT's Discovery Park

In addition to new construction already underway and the planned reassignments, renovations, and reallocations, UNT will need to construct a 100,000 ft² trans/interdisciplinary Science and Technology Research building during the course of this plan. This new Science and Technology Research building would be located at Discovery Park. With approximately 290 acres at Discovery Park, plenty of land exists for such a building. This facility will be designed and built as a multi-phase structure so that future growth can be accommodated at the same site. Phase I (estimated 57,000-59,000 ft²) would be occupied in 2013 and paid for with institutional funds already identified to finance a loan of approximately \$55 million. Funding will be sought via the TRB process during the 82nd Legislative session to add Phase II and expand it to the full 100,000 ft². Should TRB funding not be possible for Phase II, additional needs for research space will be accommodated by reallocations and reassignments until resources for Phase II can be identified.

The new Science and Technology Research building will house many of the new hires (those whose laboratory-based research best fits the venue). Other occupants would be current UNT faculty whose research meshes with the new faculty and with the types of laboratories in the new building. Laboratories vacated by current UNT faculty will then be re-purposed to accommodate additional new hires.

Because new construction inevitably takes time to bring online, it is critical that UNT implement short-term space-generating solutions so that the planned faculty hiring can begin immediately and proceed in the timeframe laid out above. Thus, a number of initiatives are underway or planned to yield useable space.

Reassignments, Renovations and Reallocations

Reassigned space from vacant positions	15,000 ft ²
Renovated space in the Science Research Building (SRB)	37,000 ft ²
Renovated space in other buildings	10,000 ft ²
Renovated space in vacated Business Administration Building	40,000 ft ²
Renovated space in Discovery Park	20,000 ft ²

New Construction

New Life Sciences Complex	87,000 ft ²
New space for research initiatives in Business Leadership Building	40,000 ft ²
Planned Science and Technology Research building Phase I	<u>*57,000 ft²</u>
Total	306,000 ft²

*Phase II of the Science and Technology Research building would comprise 40,000-50,000 ft² and will be added if state funding can be secured.

Several off-campus buildings are currently being acquired or considered that could house vital-but-nonacademic university functions (specialized storage, community clinics, some aspects of information technology services, etc.), allowing renovation and reallocation of the associated on-campus space.

To provide some near-term space generation, on-campus high-quality modular buildings are under consideration and may be pursued as space for dry laboratories and/or academic uses. By utilizing rapidly-installed modular buildings, some laboratory-worthy space in existing buildings that is currently occupied by functions not requiring laboratory infrastructure could be made available for renovation and reallocation.

Lastly, a university-wide space assessment will undertake the difficult task of evaluating the optimal use and assignment of space, with a high prioritization of research laboratories generating restricted research funding. Useable laboratory space currently occupied by lower-priority functions will be targeted for reassignment.

Major space construction, reallocation, and renovation will be required to accommodate the faculty researchers and their equipment required to move UNT toward national research university status. Beyond the necessity of additional space merely to accommodate new faculty hires, the ability to offer newly-renovated or newly-constructed laboratories substantially improves UNT's ability to recruit top researchers to join our faculty.

VI.2. Other Research Facilities

State-of-the-art research requires state-of-the-art tools. UNT has already begun an aggressive program to upgrade and expand research infrastructure. Below are some examples of the current and planned initiatives to meet the growing needs of current researchers and proposed new hires.

VI.2.a. Laboratory Construction, Upgrades, and Renovations

VI.2.a.i. Recent Major Facility Upgrades

Center for Advanced Research Technology (CART). Over the past five years, UNT has received major DOD funding (~ \$10 million) to establish the Center for Advanced Research Technology, a platform for inter-disciplinary research activities in the sciences and engineering focusing primarily on the chemical, structural, electronic, and optical characterization of materials. CART houses a distinctive set of 27 state-of-the-art instruments for processing/synthesis, characterization, and analysis of materials and nano/micro devices. UNT is one of only five public institutions in the country to have the unique trio of a dual-beam focused-ion-beam scanning electron microscope (FIB/SEM), an analytical high-resolution transmission electron microscope (TEM), and a 3D local electron atom-probe (LEAP). The CART facility supports advanced scientific research activities within UNT, and also with other universities, national laboratories, and local and national industrial partners with the purpose of facilitating multi-disciplinary research. A current plan (with possible NSF support) to consolidate the spatially dispersed instrumentation into one modern facility will optimize use of the center's resources and will improve research interactions.

High Performance Computing. There was a significant need for a variety of computational needs by many different types of researchers. UNT addressed this need by adding a new centrally maintained facility as well as several specialized laboratories.

- A new research **High-Performance Computing (HPC)** System was installed in the past year and became available for use by UNT researchers in November, 2009. The HPC System was designed to support research with computationally-intensive needs. This new system represents a ten-fold increase in computing power over that which was previously available and is the most powerful such system in an academic facility in the North Texas region. At the time of installation, additional power and air-conditioning was added to accommodate growth as UNT expands its computationally-intensive research over the next decade.
- The **Design Render Farm** in the College of Visual Arts and Design is a new computational facility that allows high resolution and high-speed computation for producing animation, interactive video, and high quality visual imaging. It supports a range of research in design and the arts.
- A new **Visualization Laboratory** was created to support graphically intensive research, simulations, statistics, and design. The facility supports research in a broad range of areas including materials engineering, political science, and information science.
- The **Center for Advanced Scientific Computing and Modeling (CASCaM)** was established with funding from the national Department of Education to support the needs of science and engineering researchers in multiple departments primarily in computational chemistry and materials modeling. Among the core members of CASCaM are several nationally recognized researchers in UNT's computational chemistry program, one of the most comprehensive computational chemistry programs in the country. UNT recently upgraded (March 2010) the CASCaM computer server room, including improved air-conditioning and power, to accommodate new computer hardware funded by NSF. The size of the upgrade will allow for additional growth as CASCaM expands over the next decade.

VI.2.a.ii. Upgrades Planned or in Progress

Research Field Station in Southern Chile. As part of an international memorandum of understanding between UNT and Chilean partners (the University of Magallanes and the Institute for Ecology and Biodiversity), UNT is helping to build and equip a Research Field Station on an island in southern Chile. Ecological, biological, climatic, and ethnographic research is planned for the field station, as well as projects in the applied philosophical field of environmental ethics.

A new 3000 ft² ***Cleanroom/Nanofabrication Analysis and Research Facility*** is currently under construction. It will include both Class 10,000 and Class 100 space and contain a range of tools to fabricate and study nanoelectronic and nanophotonic devices. It will support researchers in the physical sciences, biological sciences and engineering working on nano and microscale technologies and novel new electronic and photonic materials.

Targeted upgrades of various multi-investigator facilities began approximately five years ago. This has been supplemented, starting two years ago, with additional upgrades of several additional multi-investigator facilities and some individual investigator instrumentation. It is anticipated that there will be a ***continuous review and upgrade of existing equipment*** as the university moves forward and further refines hiring priorities, but funding for such upgrades will rely increasingly on external funding. This approach is already showing success. Upgrades or new equipment requiring university funding will likely be required to meet the needs of specific new faculty and therefore will come from start-up funds.

VI.2.b Support Personnel

An additional critical component to the state-of-the-art research facilities is a qualified technical staff for operation and maintenance. A significant number of such individuals have already been added in support of various multi-user facilities. Many additional such personnel will be added. Salaries for these additional personnel are included in the cost estimate for this plan (Section II).

VI.2.c. Expansion of Economic Development Resources

UNT is developing its Discovery Park as a fully functioning research park. A Director of Discovery Park and Technology Transfer has been put in place to coordinate research park activities. Renovations are now complete on a main office for Discovery Park, a suite that also includes offices for start-up companies that will contract with Discovery Park's technology incubator. Construction is soon to begin on the first phase of laboratory and office space for start-up companies. There will be multiple opportunities for faculty and student researchers to interact with these companies. Moreover, the opportunities for faculty start-up companies, coupled with new, expanded marketing approaches for new intellectual property, promises to bring a greater dimension to various areas of applied research.

VI.3. Library Facilities

The UNT libraries are planning a series of programmatic enhancements to better support the research efforts of UNT scholars in conjunction with the aim of reaching national research university status. These enhancements will build on previous successes and particular strengths of the UNT libraries.

A key goal of these enhancements is to enable the UNT libraries to obtain membership in the Association of Research Libraries (ARL). If successful in joining ARL, the UNT libraries will have achieved a major mark of distinction both as an indicator of (1) successful support of research activities at UNT, and (2) as

a metric of a national research university status as assessed by the THECB. All of the strategic aims for the UNT libraries during the next few years have been selected with an eye to advancing both of these goals.

VI.3.a. Plans for Expansion and Enhancement

A dramatic *enhancement of the collection development program* will be undertaken by the libraries. This enhancement is needed to bring the monographic and serial collections of the library up to the comprehensive ARL standards needed for top tier research activities. The collection development program will include a thorough gap analysis of UNT collections as referenced against the holdings of aspirational peer institutions. This analysis will identify priorities in monograph and serials acquisitions to guide collection development investments, remediate gaps in the holdings of the UNT libraries, and ensure alignment with ARL candidacy requirements.

Creation of *nationally recognized programs in digital scholarship* based on collaboration between researchers, librarians, and external communities will be another key program enhancement within the libraries. This program builds on a decade of steady successes in the area of digital library projects, which has attracted an average of more than \$500,000 annually and garnered national recognition for the UNT libraries as an innovator in scholarly communication. Further investments will be made in building up the capabilities of the UNT libraries to attract more restricted research funding. The goal will be for librarians to obtain an average of \$1 million annually in restricted research funding over the next five-year period for digital scholarship projects in collaborative partnerships between the faculty and the library. To accomplish this goal, the libraries will establish a new Digital Information and Scholarship Center (DISC) charged with systematically seeking collaborative funding for programs aligned with the campus strategic goals of acquiring restricted research funding and increasing the production of doctorates. The DISC will further raise the profile of UNT as an innovator in digital scholarship and research services, bolstering our ARL candidacy in the process.

Major improvements in library research facilities will be implemented during the next five years. Bringing the UNT library facilities up to top tier research institution standards will be critical in order to provide space for collaborative library research activities with faculty partners, as well as for adequate additional collections storage and processing facilities to accommodate growth in research collections. The libraries will fund these facilities improvements using existing budget streams, working with relevant university planners to address immediate facilities needs and to develop a long-term library master plan aligned with campus strategic priorities.

The libraries will lead cooperative statewide efforts to *promote open access and digital preservation policies* for scholarship. The UNT libraries have joined the ARL Scholarly Publishing and Academic Resources Coalition (SPARC) as well as the International Internet Preservation Consortium (IIPC) and MetaArchive Cooperative digital preservation alliances. The UNT libraries will foster open access policies and sustain digital preservation of research information by organizing major events and undertaking collaborative projects in these areas involving faculty, the libraries, other campus groups, and other partner research institutions.

Membership in the Association of Research Libraries is projected by 2015. In recognition of the importance of ARL membership as a mark of national research university excellence, the UNT libraries have been in dialogue with ARL for more than two years regarding the process of becoming a member of the Association. In order to become eligible for ARL candidacy, the UNT libraries must first demonstrate

positive growth in ARL investment and traditional membership index scores for a requisite three-year period. These index scores are derived from growth across multiple metrics, primarily including library budget, collections, and staff. After three years of growth in the two index scores, an application for ARL membership can be initiated. Success in the one to two-year application process will require satisfactorily demonstrating to visiting committees that the libraries have achieved a high level of success in providing research services, information access, and that the libraries have strong university administration support for library programs. It should be acknowledged that, quite apart from ARL membership consideration, *all* of these elements are necessary for strong library support of top tier research activities. These steps are therefore necessities for the UNT libraries to accomplish in any scenario that sees the university successfully become a nationally renowned research institution, regardless of whether or not UNT is able to join ARL.

Provided that UNT demonstrates sustained strength in all the characteristics of a research library as assessed by ARL in its index scoring system, there is every reason to anticipate that ARL will welcome the candidacy of the UNT libraries, and that UNT will become a new member by 2015.

VI.3.b. How Enhancements Advance Existing and New Doctoral Programs

Library collections, services, facilities, and collaboration with faculty all contribute directly to supporting existing and new doctoral research programs. Doctoral level research requires access to comprehensive and deep information resources in the form of collections of scholarly publications and primary research material. The range of doctoral programs at UNT is broad, requiring wide-ranging monographic and serial collections across the humanities, social sciences, pure and applied sciences disciplines in which graduate students may pursue doctorates. Moreover, access to comprehensive digital information resources and services is now a critical underpinning of doctoral research in all fields, from the most current scientific and engineering findings to digitized archives of primary research materials.

As new doctoral programs are initiated, library collections and services must grow concordantly. As UNT adds doctoral programs in pharmacy and other disciplines, the library is expanding its collection development and reference programs to meet the needs of new graduate students. The new collection development division of the libraries will engage in proactive analysis of how to best meet the needs of new doctoral research programs, and will use a variety of assessment techniques for strategically identifying collecting areas in support of new programs. This is part of a larger assessment effort within the libraries which, in cooperation with the Office of Institutional Research and Effectiveness.

Finally, as doctoral students engage in cutting edge research, the libraries have begun to partner with them to create new forms of innovative scholarly communication. The UNT libraries, in collaboration with the UNT Press, the Texas State Historical Association, and a wide cross-section of faculty members, are experimenting with new forms of research publication and synergies with discovery systems such as the Portal to Texas History. As doctoral research at UNT changes and grows, the UNT libraries will continue to evolve and grow to address the information needs of the scholarly community.

VI.4. Resources for Obtaining and Leveraging Philanthropic Funds

Although the goal of reaching an endowment level of \$400 million in the next five years is not feasible, UNT's Office of Advancement will play a significant role in advancing UNT toward Tier One in the short term by aligning fundraising efforts with the priority research areas. At the same time, Advancement will strive to meet annual endowment growth goals over the next 10 years to build toward the desired

endowment minimum of \$400 million (see Table VI-1). Due to a volatile economy and transitions in UNT’s leadership, a precise date for reaching the \$400 million goal cannot be projected at this time.

Table VI.1. UNT Goals for Endowment Growth from New Gifts

<i>Fiscal Year</i>	<i>Growth Rate from New Gifts (%)</i>	<i>Goals (\$)</i>
2011	3%	\$108.6M
2012	4%	\$117.6M
2013	4%	\$127.2M
2014	5%	\$137.4M
2015	5%	\$148.3M
2016	7%	\$159.8M
2017	7%	\$172.2M
2018	8%	\$185.6M
2019	8%	\$199.9M
2020	10%	\$215.4M

VI.4.a. Building the Endowment

Endowment growth is impacted by two factors: (1) fundraising to add new gifts, and (2) endowment growth through investment income. Growth will be further enhanced by state matching (TRIP funds discussed below). Advancement’s endowment growth goals are related to the first factor—adding new funds to the endowment, since growth due to investment income is a function managed by the UNT Foundation, Inc., an independent 501(c)(3) organization which manages the majority of UNT’s endowment.

The endowment generates an average of 7 to 8 percent in investment income each year; however, after an annual distribution of 4 percent to UNT programs, only the remaining 3 to 4 percent annually apply toward endowment growth. This model is consistent with endowment growth from investments reported by universities nationwide.

Endowment Goals – Advancement is implementing yearly goals toward building the endowment through new gifts—with a focus on building the capacity of fundraisers. Although endowment growth rate from new gifts has historically hovered between 3 and 5 percent per year, it is anticipated the rate of growth from new gifts can progressively ramp up to as much as 10 percent annually over time (as shown in Table VI-1).

Goals for Securing Chairs, Professorships and Graduate Fellowships – A focus on securing endowment funds for chairs, professorships, and graduate fellowships serves the dual purpose of building the endowment while also supporting UNT’s research initiatives. Advancement leadership will work with ORED leadership to determine the research areas where the need is most critical for each of these types of endowments, and where there is the best potential for fundraising success. From this process Advancement will determine priorities and goals for securing chairs, professorships, and graduate fellowships and set goals based on the feasibility of securing these endowment funds.

Texas Research Incentive Program (TRIP) - Although deposits from all seven emerging research universities on September 1, 2009, resulted in the expenditure of all the state funds set aside for TRIP

(\$25 million in FY 2010 and \$25 million in FY 2011), UNT and the other universities, may receive additional state matching through TRIP funds in the future. The THECB is encouraging the universities to continue to submit all qualifying gifts. THECB officials emphasized the importance of this effort, as these continued submissions will demonstrate the importance and success of this program to legislators and influence them to replenish the fund.

Additional UNT submissions (above and beyond the approximate \$2.6 million submitted on Sept. 1, 2009) include:

- \$100,000 gift for Autism Fund for Excellence submitted in September 2009 – eligible for 50 percent match
- \$600,000 gift for Autism facility submitted in February 2010 – eligible for 50 percent match
- \$107,000 final gift for music chair submitted in Feb. 2010 – eligible 50 percent match
- Planned submission of \$100,000 gift for Portal to Texas History in March (after check arrives) – eligible for 50 percent match

The Office of Advancement will continue to submit all qualifying gifts to the THECB. Note that the Office of Advancement will continue to closely coordinate with the Office of Research and Economic Development to submit all qualifying grant awards processed through that office as well. Should this TRIP fund be replenished by the legislature, all gifts submitted to grow the endowment for research related purposes may be matched by the State of Texas, many of which will be deposited into endowment accounts.

Planned Giving – UNT’s focus on planned gifts has increased in the last 15 years, and many gifts logged in inventory during this time have yet to be realized. Because planned giving is widely acknowledged among development professionals as the contribution vehicle most important to endowment growth, concentrated efforts will be made to continue to step up efforts in this area. Planned gift inventory currently is approximately \$76 million. Specific activities to increase planned gift inventory include:

- Educating Development Officers on charitable remainder trusts (the most commonly used planned gift vehicle).
- Aggressive marketing to target a specific alumni demographic.

Matching Grants – In recent years, matching gifts in addition to TRIP have provided incentive to donors and have impacted the growth of the endowment. A focus on soliciting matching grants to build the endowment will become a priority. Examples of previous matching gifts that can be used as models to build the endowment include:

- *Greater Texas Foundation* awarded an \$80,000 matching grant for an Emerald Eagle Scholar endowment to build on an existing Greater Texas Foundation endowment. This endowment in the UNT Foundation, which was approximately \$20,000 when the matching grant was awarded, increased to nearly \$200,000 with the match incentive.
- *National Math and Science Initiative (NMSI)* awarded a \$1 million matching grant to UNT to support Teach North Texas upon selection as replication site for UTeach. Approximately \$750,000 already has been raised toward completion of that endowment, and efforts are underway to secure the additional \$250,000.

- *Title III.* When UNT was awarded the Title III grant, a provision in UNT’s proposal designated a portion of the grant (\$295,000) to be raised over five years as matching funds for the Emerald Eagle Scholar endowment. Approximately \$72,000 already has been secured.

VI.4.b. Strategies for Increasing Gifts to Support Research

Priority research areas identified in this plan, and/or any subsequent research areas determined by UNT leadership to be priorities, will be integrated into Advancement’s strategic plan for fundraising. This will provide UNT fundraisers with an unprecedented level of alignment with university priorities that will, in turn, position UNT’s fund-raising efforts for unprecedented success. Because fundraising is more successful for projects that, (1) clearly align with the university’s priorities and direction, and (2) are in areas where the university is making an investment, UNT Development Officers will be able to make a much stronger case to potential donors. The following strategies and tools are being implemented to enhance fundraising efforts for gifts to support research.

- *Establish a Tier One Fund in the UNT Foundation* – This fund will provide a vehicle for donors on all levels to contribute to UNT’s Tier One effort. It also will provide a focal point for broad-based donor appeals and be a fund where online gifts can be deposited.
- *Online marketing and giving opportunity to UNT’s Tier One Research Fund* – Advancement will dedicate a web page to a description of Tier One giving opportunities and make a case for the benefits of giving to this initiative. The web page also will provide a “give now online” option.
- *Case Statements for Endowed Chairs, Graduate Fellowships, and Research Initiatives* – In the same way case statements are developed as tools for Development Officers for priority projects like the football stadium, Advancement also is crafting case statements related to specific research initiatives described in this document. These case statements may be used to secure gifts to support endowed chairs, graduate fellowships, and research initiatives. These case statements will be tailored to the targeted areas and provided to Development Officers to use as they meet with prospective donors.
- *Development Officer Education* – In response to TRIP, Advancement already has stepped up efforts to educate Development Officers regarding research at UNT. The Vice-President of Research and Economic Development already addressed a Development Officer meeting, and Directors of Research Development volunteered to accompany fund-raisers on appointments with potential donors. Advancement will put systems in place to update Development Officers and provide educational opportunities (lectures, webinars, etc.) to enhance their efforts.

VI.4.c. Fundraising for Expendable Funds for Faculty Start-Up Costs

As university leaders determine specific high priority projects (laboratories, facilities, etc.) needing expendable research funds for faculty start-up costs, the VP of Advancement will set fundraising goals based on the feasibility of raising funds for those projects.

Current projections for raising funds (including TRIP matching) to support faculty start-up costs and other research expenditures are shown in Table VI.2. These projections are based on fund raising feasibility for the new Life Sciences Building and Business Leadership Building where Advancement

already is engaged in fundraising activities. To date, Advancement has secured a \$500,000 commitment over the next two years from a private foundation to help equip two labs in the Life Sciences Building related to funded research clusters.

The TRIP state matching fund program also matches expendable gifts to support research, and may contribute to Advancement’s efforts should additional funding for the program be approved by the Texas Legislature.

Table VI.2. UNT Projections for Expendable Research Gifts

<i>Fiscal Year</i>	<i>Goals (\$)*</i>
2011	500,000
2012	750,000
2013	750,000
2014	500,000
2015	500,000

*Includes TRIP matching

VI.4.d. Advancement Resources

In addition to Development Officers in the colleges and schools, Advancement’s Office of Corporate and Foundation Relations (CFR) and major gifts officers also work to secure private funding for the endowment and research initiatives. In coordination with ORED, Advancement’s CFR Office helps researchers locate private foundation and corporate funders, reviews and distributes relevant requests for proposals (RFPs) from private funders, and collects funding information and then distributes it to targeted faculty whose expertise aligns with the funding opportunity. CFR also collaborates with the ORED Research Development Team to conduct grant-writing workshops for faculty.

CFR’s team of two professional proposal writers work one-on-one with faculty to develop the highest quality proposals to private funders in coordination with ORED. The CFR team also works externally to develop relationships with potential funders, bring them to campus and introduce them to research funding opportunities at UNT.

Summary of Resources to Obtain Philanthropic Funding

- Establish goals priorities and strategies to build the endowment in the UNT Foundation
- Set goals:
 - Escalate rate of growth of endowment from new gifts to 10% annually by 2020
 - Growth of endowment to \$215.4 million by 2020
- Secure gifts for endowed chairs, professorships and fellowships to meet endowment goal by increasing planned gifts and matching grants, and by applying for TRIP state matching funds
- Establish a Tier One Fund in the UNT Foundation for expendable gifts to support research
- Develop case statements for use by Development Officers to secure funding for priority research areas
- Coordinate with university leadership and ORED to establish priorities for securing expendable research gifts to support faculty start-up
- Commit Advancement resources including Development Officers, Major Gift Officers, and the Office of Corporate and Foundation Relations to working toward endowment and expendable research funding goals

VII. NATIONAL VISIBILITY

A number of disciplines and initiatives at the University of North Texas have already achieved national prominence. Maintenance and continued promotion of these strengths will assist UNT as we move toward national research university status. A brief overview of some of these programs and activities is provided below.

VII.1. NSF Net-Centric Software & Systems Center

UNT's Net-Centric Software & Systems Center (Net-Centric) is funded by NSF's Industry/University Cooperative Research Center (IUCRC) program. UNT's center focuses on a collaborative approach of research and development in net-centric systems. This allows Net-Centric to draw on the expertise of industry and academia to offer a computing model for the future. This approach no longer views applications as having a fixed set of capabilities; rather, applications are viewed as dynamically created from acquired services, then verified and validated in the field in real-time. Net-Centric offers a rich environment for collaboration between industry and academia, and cutting-edge research opportunities focused on critical business partner technology needs.

VII.2. Semiconductor Research Corporation Center for Electronic Materials Processing and Integration (CEMPI)

The Semiconducting Research Corporation (SRC) is a consortium of leading semiconductor manufacturers and equipment makers, including IBM, Intel, Texas Instruments, Applied Materials, Novellus Systems, Freescale, Global Foundries, Tokyo Electron Limited, Advanced Micro Devices, Mentor Graphics, and Rohm and Haas Electronic Materials. The SRC supports university-based precompetitive research into microelectronic device design, materials and processing. The SRC and UNT have combined to establish a Center for Electronic Materials Processing and Integration (CEMPI) at UNT. CEMPI focuses on research on interconnects—the nanoscopic Cu wires which connect the more than 1 billion transistors on a single chip. The research will involve faculty and graduate students from UNT and many other institutions, including Berkeley, Michigan, Columbia, Maryland, Penn State, Arizona State, and RPI. CEMPI, housed in the UNT Department of Chemistry, will encourage research synergies through collaborative use of UNT facilities, such as CART, and through annual review meetings to be held at UNT.

VII.3. Center for Advanced Research Technology (CART)

In addition to being an excellent resource as a research facility for UNT faculty, CART also serves to bring national recognition to UNT as a research institution. With its 27 advanced materials characterization and processing instruments, CART attracts users from corporations and other research laboratories worldwide. Users include scientists from Lockheed Martin, Texas Instruments, Raytheon, Timkin, Air Force Research Laboratory, Ohio State University, University of California-Riverside, Colorado School of Mines, Indian Institute of Technology, Monash University in Australia, Chinese Academy of Sciences, and other U.S. and international institutions.

VII.4. Music and Jazz Studies

The UNT College of Music is one of the nation's finest comprehensive music schools. North Texas graduates and faculty are exceptionally accomplished, and are consistently competitive at the highest levels of their chosen professions, often receiving Grammy nominations and other accolades. Students in

the College of Music have the opportunity to study with UNT's highly acclaimed faculty of performers, composers, scholars and researchers. To extend the prominence, UNT regularly hosts internationally recognized guest artists such as conductors, composers, singers, jazz artists and scholars through residencies, master classes and lectures.

UNT's College of Music is home to the world's premier *Jazz Studies Program*. Begun in 1947, the UNT Jazz Studies Program has become *the place* for top musicians to study and develop this uniquely American art form.

VII.5. Digital Knowledge Archiving and Management

Synergy among the UNT *Libraries' Digital Projects Unit* (DPU), the College of Information's *Texas Center for Digital Knowledge*, the *Center for Digital Humanities*, and new faculty who bring expertise in digital humanities creates an opportunity for UNT to innovate and be a national leader in the emerging field of digital knowledge management.

Already recognized for the CyberCemetery (the national archive for defunct government agency websites), *UNT Libraries' Digital Projects Unit* developed an open-source platform, technology, and tools during previous federally-funded research projects to position UNT as one of the nation's most cost-effective and heavily used resources for providing online access to scholarly resources. The recipient of more than \$3 million in external funding from both government and private sources over the last five years, the DPU is positioned to pursue even larger grant opportunities. Research areas of the DPU consist of information seeking behavior, human-computer interaction, and digital preservation at both the national and international level. But more importantly, it is a resource to help boost and support other UNT initiatives to national prominence.

The *Texas Center for Digital Knowledge* leverages UNT faculty expertise in a broad range of digital information and technology applications and encourages interdisciplinary and collaborative projects resulting in increased externally funded research and high-value research outcomes. Already at the forefront of a national movement for open access to government funded academic research (which will significantly increase the web's knowledge base), this center collaborates closely with DPU.

The Center for Digital Humanities, a collaborative effort between faculty in the Department of History and the DPU, advances scholarship in history and other humanities-related disciplines by facilitating web-based interactive scholarly dialogue; thus transforming how humanities are taught and learned. The Center, which will provide an accessible web-based resource for humanities-related information, already has garnered attention of industry giants in the online search industry.

VII.6. Health Informatics/Medical Librarianship

For more than two decades, units that now comprise UNT's College of Information have educated students for the health informatics profession with on-campus and online programs; the Medical Librarianship Program currently is ranked second nationally by *U.S. News and World Report*. Current and future need for health information professionals is unparalleled. Not only is health information used in the traditional health care environments, but it is also expanding due to consumer and public health needs and scientific research agendas. Consumer and public health issues create the need for accurate health information. Scientific research focused on genomic information increases demand for bioinformatics professionals. UNT offers health informatics studies through the M.S. in Information

Science, the Certificate of Advanced Study, and the Interdisciplinary Ph.D. Program in Information Science taught by nationally recognized faculty.

VII.7. Philosophy, Especially Applied Philosophy and Environmental Ethics

UNT is home to world's leading graduate program in environmental ethics, ranked best in the world by the International Association for Environmental Philosophy. A collaborator in the Chilean biosphere project on Cape Horn, UNT's environmental philosophy program has international reach with applied field research and exchange programs in southern Chile. This area also has a Center for the Study of Interdisciplinarity, with researchers active in defining and supporting NSF's efforts to promote broad societal impacts generated from scientific research.

VII.8. STEM Education

UNT is home of the *Texas Academy of Mathematics and Science (TAMS)*, one of the nation's first accelerated residential programs for gifted teens. UNT is also one of the first 13 sites chosen by the National Science and Math Initiative for replication of the UTeach program for math, science and computer science teachers (known as *Teach North Texas* or TNT). A state leader in the number of students selected as Goldwater Scholars in math and science, UNT also designed and implemented a summer Robocamp program (in the College of Engineering) for middle schools girls in underserved communities funded, in part, by Motorola. For the last two years, UNT hosted the Governor's School for high school seniors specializing in math and science (funded by ExxonMobil). TNT has generated nearly \$3 million in private funding for UNT from the Greater Texas Foundation, Texas Instruments, and the National Science and Math Institute. With UNT's long-time reputation for excellence in teacher preparation, the relatively new College of Engineering, and state and industry interest in funding STEM education programs, UNT plans to continue to increase its lead in this area.

VII.9. Johns Hopkins Lean Pharmacy Continuing Medical Education Curriculum

UNT plans to collaborate with Johns Hopkins School of Medicine's Center for Innovation in Quality Patient Care so that UNT's School of Pharmacy, once operational, will offer Johns Hopkins' *Lean for Pharmacy* continuing medical education curriculum. Offering *Lean for Pharmacy* training to retail and hospital-based pharmacists in Texas and surrounding states will help UNT to establish the School of Pharmacy as a hub of cutting-edge innovation, training, and education. By adapting and implementing this curriculum alongside UNT's academic program, UNT School of Pharmacy students will be able to concurrently earn certification in *Lean for Pharmacy* while matriculating in their normal course of studies.

VII.10. Design Research Center and the Initiative for Advanced Research and Technology in the Arts (DRC/iARTA)

The College of Visual Arts and Design's Design Research Center (DRC) in Dallas, opening in summer 2010, has already gained international attention through presentations of the multidisciplinary Innovation Studies MA and MFA Curricula at invited presentations in China, Spain, and at professional conferences in the United States. Partnering with agencies including *Downtown Dallas*, KERA FM (the nation's largest public radio station), and international companies including Fossil, the faculty and graduate students in this interdisciplinary program analyze and provide creative framing and solutions for organizational initiatives. The DRC is equipped with cutting edge technologies featuring a fully

functioning rendering farm for animation and data presentation, linking resources of Denton and Dallas sites of the UNT system. This international, interdisciplinary center is paralleled in the studio arts through the integration of computer technologies in photography and new media art via the Initiative for Advanced Research and Technology in the Arts (iARTA). iARTA brings together animation from computer engineering (ranked in the top 10 percent nationally), UNT's nationally ranked MFA studio art programs (ranked in the top 25-30 percent nationally), and UNT's nationally recognized programs in RTVF and music composition. The first of UNT's new research clusters to be up and running, iARTA is already attracting an international audience.

VII.11. Diversity

As one of one of only nine public U.S. universities enrolling more than 4,000 Hispanics and 4,000 African Americans, UNT Ranks in the top 50 nationally in the number of degrees awarded to minority students. In September, 2009, *Excelencia in Education* (a Wal-Mart Foundation initiative) named UNT as one of the 20 campuses nationwide selected to receive SEMILLAS grants. SEMILLAS is an acronym for Seeding Educational Models that Impact and Leverage Latino Academic Success.

VII.12. Prestigious National Honor Societies

UNT has had a chapter of Phi Kappa Phi for many decades. As a national honor society, Phi Kappa Phi promotes excellence in all fields of higher education and recognizes UNT's excellent student scholars for their accomplishments. Recently, UNT has submitted application materials to begin a chapter of Phi Beta Kappa. The Phi Beta Kappa evaluation process is lengthy, and tends to favor liberal arts institutions with many Phi Beta Kappa members on the faculty. Nonetheless, making Phi Beta Kappa membership available to UNT's outstanding students will be beneficial to the value of their degrees, so UNT is pursuing this opportunity on their behalf.

VII.13. International Outposts

UNT is breaking new ground internationally not only by forming collaborative international research and academic partnerships, but also by establishing UNT outposts in the countries where some of these partnerships thrive. UNT has a liaison office at the Autonomous University of the State of Mexico (UAEM) in Toluca, and UAEM has a liaison office on-site at UNT. These respective liaison offices are staffed by persons who coordinate faculty and student exchange programs, new proposed initiatives, and joint research collaborations. UNT also is a full partner in a field station under construction on Puerto Williams Island in southern Chile as part of the collaborative agreements with the University of Magallanes and with the Institute of Ecology and Biodiversity in Chile. Several persons involved in the collaboration are jointly employed by UNT and the partner institution, and they spend portions of their time in both countries. These international outposts could become models for other U.S. institutions to follow in broadening their global impact.

National Visibility

- UNT is home to many national centers, institutes, and programs.
- Strategic plans focus on aggressively building externally-funded centers and institutes that can contribute to restricted research expenditures, and add to UNT's national and international visibility.
- UNT plans to be at the forefront of global education and research through existing and future partnerships.

VIII. UNT AS ONE OF THE NATION'S *GREAT* UNIVERSITIES

This strategic plan for research lays out a future for UNT that is consistent with the direction the institution has been moving in recent years. However, this plan presents new and aggressive initiatives to accelerate UNT's march toward its vision as a national research university.

Implementing this plan and growing UNT's strengths in the targeted areas outlined herein will result in UNT reaching a momentous milestone in the institution's history. UNT has the potential to become one of the institutions people include in the implicit category of *great American universities*. Such great universities do not rely on a small number of science and technological disciplines to express their excellence. Nor do institutions that excel only in the arts and humanities break into the ranks of this unofficial-yet-very-real group of academic icons. UNT is already a comprehensive university. National and international prominence has been built in several corners of the institution's broad array of academic programs, scholarly disciplines, and research niches. UNT now plans to embark on a sustained effort to develop research excellence in areas critical to the institution, the community, Denton, and society at large. Although an extension of the path UNT has been on for many years, this plan represents nothing short of transformation for the university.

The hiring plan alone, once completed, will have the effect of transforming the research culture of UNT. By 2020, more than 200 new faculty (representing approximately 20 percent of the UNT faculty cohort) will be in place whose research skills and accomplishments will directly contribute to the institution's key goals of increasing funded research, producing Ph.D. students, and achieving national recognition. These new faculty will join the approximately 20 percent of current faculty whose expertise already aligns with these specific goals. An additional 30 percent or more of the faculty by 2020—humanities scholars, creative artists, and researchers from across the remaining disciplines—will be actively engaged in doctoral training, influential research, scholarship, and creative endeavors that garner national and international attention (even if not external funding). Thus, the vast majority of the UNT community will be engaged in roles that actively contribute toward those aspects of UNT's mission that are crucial to attaining recognition as a national research university. All faculty at UNT have critical roles to play, including those who focus almost exclusively on providing a high quality education for the ever-growing cohort of undergraduates. Such broad-based contribution of faculty toward the excellence of the institution is a hallmark of a great research university.

The University of North Texas will be recognized as one of the leading comprehensive research universities in the nation.

The vision of UNT as a national research university is clear. The challenging work that lies ahead to achieve this vision is invigorating and exciting to UNT leadership, faculty, students, and staff.