A PATH TO ENHANCING RESEARCH AND SCHOLARSHIP THROUGH COLLABORATION

A REPORT BY THE TASK FORCE ON ACADEMIC COLLABORATIONS

HEALTH & BIOINNOVATION

GLOBAL STUDIES: GULF REGION, LATIN AMERICA & AFRICA

ENVIRONMENT, ENERGY & RESILIENCE
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I. EXECUTIVE SUMMARY

The Task Force on Academic Collaboration has evaluated opportunities for excellence at Tulane University. We first assessed the array of challenges and opportunities that we face as a society. Next, we considered how a Research 1 university of Tulane’s size and ambition could best address these issues. This Executive Summary has four brief sections: A. Grand Challenge Issues; B. Tulane’s Opportunities and Approaches for Collaboration; C. Suggested Academic Model Modifications and Investments, and D. Vision of the Future.

A. Grand Challenge Issues

We first evaluated the landscape of major issues that we face as a society and their relevance to Tulane. Several overarching issues are readily apparent that are both risks and opportunities:

- **Globalization and International Competition** – Tulane is in an international university with a role in training students in a highly interconnected society. Global interactions improve the quality and relevance of our scholarship; they increase the number of students interested in attending Tulane, and they provide career development opportunities.

- **Environment** – our world is at risk due to anthropogenic climate change, and New Orleans is at the epicenter of an endangered environment. This puts our existence in jeopardy, and also is an opportunity to be agents of change.

- **Energy** – modern societies depend upon sustainable low-cost energy. The Gulf Region is intimately tied to our nation’s energy resources. However, energy development puts our region at risk, as is evident by wetlands damage and the BP oil spill. The tension between growth and risk provides an opportunity for design and scholarship at the highest levels.

- **Health** – Our nation recognizes the importance of healthcare, but costs are high and disparity exists. Globalization increases risk due to enhanced propagation of infectious diseases (e.g. ebola, HIV, chikungunya). Methods of diagnosing and cost-effective treatment must involve innovative approaches.

It is clear that scholarship in only limited areas will be insufficient to solve these global issues, and collaboration is the best approach for moving forward. Bringing together our resources to create collaborative networks addresses a disadvantage for Tulane – we are a small AAU Research I university that lacks the economies of scale afforded larger universities. We must consider how best to leverage our already considerable infrastructure and faculty strengths in the competitive economic environment affecting higher education in the 21st century.

B. Tulane’s Opportunities for Collaboration

Tulane’s long tradition of interdisciplinary teaching and research and its geographic situation as the major educational institution in one of America’s most important and vibrant economic and cultural ports are distinct advantages in meeting these challenges and opportunities in cost-effective and innovative ways.
1. **The Environment, Energy and Resilience**: As a city embedded within an at-risk coastal landscape of globally relevant culture, rich energy assets, and prized natural resources, New Orleans serves as an exceptional natural laboratory for addressing many of the environmental challenges of the 21st century. As the leading research university in New Orleans, Tulane is poised to advance innovative pathways to balance growing demands for energy, environmental stewardship, and a resilient society. Our range of expertise sets us apart from our peers because of our emphasis on the sociological and public health issues, as well as physical and biological aspects, of environmental science and energy.

2. **Global Studies – Gulf Region/Latin America/Africa**: Tulane has robust, nationally recognized programs already in place that focus on the uniqueness of the Gulf Region, Latin America, and Africa and the historical intersections between these world regions and cultures. Global scholarship represents a longstanding cornerstone of excellence at Tulane University that is well supported through the Stone Center and Murphy Institute. Our academic presence in the Americas has earned global name recognition and an excellent national profile in broad-ranging issues from cultural heritage to public health. The Murphy Institute, inspired by the interdisciplinary field of political economy, cultivates research on our immediate region, Latin America, and Africa. In Africa, Tulane faculty members work in at least 30 countries on interdisciplinary topics including health, energy, economics, government, policy and capacity building. This confluence of programming already in place at Tulane provides a special opportunity for immediate faculty and student engagement and long-term leveraging of our current research assets.

3. **Health and Bioinnovation**: Tulane University has strong interactions between the schools of Medicine, Public Health and Tropical Medicine, Science and Engineering, and the Tulane National Primate Research Center, a Regional Biocontainment Laboratory and the New Orleans Bioinnovation Center. Tulane University is our nation’s only institution with this unique constellation of research resources. Tulane has domestic and international programs dedicated to health disparities, and maintaining and assessing health. Furthermore, research currently underway at Tulane in bioinnovation offers promise in the emerging field of entrepreneurship by way of technology transfer and the translation of biomedical and engineering research into marketable medical technologies and devices. This provides links to Business and Law, and naturally draws faculty and students from across the university due to significant opportunities for career development.

By expanding these collaborative areas, undergraduate instruction can be improved through increased contact with tenured faculty members in highly meaningful areas. Moreover, the ability to attract and retain outstanding faculty members who can best model and teach this level of expertise hinges on Tulane’s enhanced commitment attract such faculty. **We have identified the following distinctive approaches that already bring students and faculty together across our university:**
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a. Contemporary Methodologies – Design Thinking, Computation and Analysis: These are vibrant areas of scholarship and education at Tulane that advance our collaborative mission. These strategies address complex problems and are necessary to educate the leaders of tomorrow. As we seek to bring people together from across schools, design thinking, technology and computer/computational science should play a larger role, and additional investments in these areas are warranted.

b. Community Engagement, Social Innovation and Entrepreneurship: Tulane is at the forefront of American higher education in the integration of social innovation, community engagement, and design thinking into its core institutional mission and culture, which amplifies Tulane’s commitment to innovative problem solving by bringing together the liberal arts (humanities, social sciences, and the arts) and the health and physical sciences to impact research and scholarship in areas of strength and demonstrated excellence across the university.

c. New Orleans as a Cultural Archive and Laboratory (NOCAL): The culture of New Orleans and the Gulf Region is known and valued world wide as a vital and imaginative source of history, literature, and the fine and performing arts. We view New Orleans and the Gulf Coast region as an archive that documents a unique cultural heritage, and as a laboratory within which that heritage is continually engaged. NOCAL brings together the humanities, social sciences, arts, physical sciences, and professional schools around complementary elements of city, culture, and community.

d. Business, Economics, Public Policy, and Regulatory Innovation: We have been at the center of disasters, and Tulane has played a large role in crafting the public policies and regulations that drive our ability to rebound and improve regardless of the situation. Tulane is already a major player in the area of public policy and regulatory innovation, and can expand in the collaborative areas described in this Report to advance our leadership.

C. Suggested Academic Model Modifications and Investments

We have significant strength in the areas described above, and our scholarship and teaching tactics are well positioned to bring students and faculty members together in meaningful ways. Nevertheless, to implement these advancements, the Task Force suggests several approaches.

In the short-term:

1) Strategically create new University Professor faculty positions. These endowed, tenured appointments at the senior level should ideally span at least two schools. A University Professor’s expertise will be directly relevant to one of the three areas of collaborative strength, and they will be leaders who will attract people across disciplines to solve problems that will help our region and society.

2) Expand professional education programs through joint degree programs and/or certificate programs that link training in strategic areas that deliver life-long value. Examples include an undergraduate engineering or environmental studies degree with the MBA or Masters of Management in Energy, combined MBA/MD, MBA/Law, Coordinate
I. Executive Summary

Majors that connect multiple departments, Masters degrees in Science/Engineering combined with an MBA, as well as interdisciplinary PhDs such as the Bioinnovation, Aging Studies, and the City, Community and Culture programs that already exist. Current Tulane graduate and professional programs can be adapted to create a new generation of leaders with training in related fields that complement their primary areas of expertise.

3) **Enhance Contemporary Methodologies of Scholarship and Research.** Computer science, computational science and design are scholarly pursuits at Tulane that are also essential aspects of a modern repertoire that advance collaboration. Therefore, these areas are recommended for enhanced support, especially when there is a focus that aligns with the main collaborative areas defined by this report.

In the **long-term:**

4) **Develop Institutes that span schools.** Just as the Murphy Institute focuses on political economy, ethics and public policy, and the Richard Thayer Stone Center leads our collaboration in Latin America Studies, our long-term goal should be to develop institutes in

a) **Environment, Energy and Resilience** and b) **Health and Bioinnovation.** These institutes would take a think-tank approach to problem solving, would attract faculty and students from across the university, and would provide a home for visiting scholars. This catalyzes engagement in big-picture problems by lowering the activation energy required to develop and sustain projects. **This is not just a physical space issue - it is a human issue that also depends on strong and passionate leadership in the interdisciplinary area.** These institutes could also become the natural coordinating site for student internships and federally funded training grants in particular disciplinary and cross-disciplinary fields. Planning for this long-term goal is timely, since Tulane is currently developing a Master Plan for all of its campuses.

5) **Other investments are necessary.** Our report specifies other highly significant infrastructure to bring together faculty and students under the same umbrella. This includes the renovation of Stern Hall and Hutchinson Memorial Building. These two buildings are singled out because they have a significant history of importance in health-related research, but have documented deficiencies that put our research capacity at risk. We must also increase faculty capacity in key areas, potentially through cluster hires.

D. Vision of the Future

The Academic Collaborations Task Force believes that Tulane can be enormously successful in developing research and educating students through the models we propose, and that **Tulane is the ideal size** to do so. Smaller universities cannot provide interdisciplinarity at Tulane’s level because of insufficient breadth, lack of professional schools, and inadequate resources. And, larger schools are frequently ‘siloed’ and do not emphasize undergraduate education linked to research and career development. So, while our size is small, we can be nimble enough to bring together resources that develop synergy. This will provide excellent opportunities for scholarship and training for our students in a global, interdependent and entrepreneurial society. We believe
that this is a highly attractive and feasible vision for the future of research, teaching and education.

With success in these areas, Tulane will be viewed as the ‘go-to' place for collaboration on some of the world’s big-picture problems. Our university will foster fundamental studies and application to focus on problems of the real world. As such, we will not be an “ivory tower;" rather, we will translate basic research to action on significant problems.

The Academic Collaborations Task Force feels that the vision outlined in the above narrative is grounded in Tulane’s historic vision of itself as a Research 1 institution that encourages interdisciplinary collaboration and innovation; informed by the resilient energy of that collaboration and innovation that has occurred in our past, and inspired with a sense of the new research potentials made possible by the multiple challenges posed to higher education and society in general in the twenty-first century.
II. Introduction

The Task Force on Academic Collaborations (TFAC) was charged by President Mike Fitts to address a three-part mandate:

- Identify areas of demonstrated interdisciplinary strength and potential for national leadership in research and education;
- Identify emerging areas with potential to reach that level, and
- Consider the tools and strategies needed to support the identified areas.

TFAC first articulated a set of principles and criteria to be applied to a focus area identified as one of collaborative strength or promise. These are:

1. The interdisciplinary field must be of specific importance to Tulane and/or our region.
2. High impact problems must be addressed.
3. Tulane University should have existing or near critical mass of salient expertise that engages multiple units.
4. The area must include an important training/teaching component.
5. The collaborative endeavor should lead to high quality scholarship and/or creative output.
6. A strong potential for external financial support and advocacy should exist.
7. An administrative structure must exist or be developed to facilitate advanced collaboration.

As the Task considered its charge to identify methods to improve collaboration at Tulane University, we evaluated the landscape of grand challenges that we face as a society. Several overarching issues are readily apparent that are both risks and opportunities for Tulane:

- **Globalization and Competition** – it is becoming trite to say that ‘the world is flat;’ nevertheless, Tulane is in an international university with a role in training students in a highly interconnected society. Global interactions improve the quality and relevance of our scholarship; they increase the number of students interested in attending Tulane, and they provide career development opportunities.

- **Environment** – our world is at risk due to anthropogenic climate change, and New Orleans is at the epicenter of an endangered environment. This puts our existence in jeopardy, and also is an opportunity to be agents of change.

- **Energy** – modern societies depend upon high levels of low-cost energy, which is directly related to their affluence and progress. The Gulf Region is intimately tied to our nation’s energy resources. However, energy development puts our region at risk, as is evident by damage to our wetlands and the recent BP oil spill. The tension between growth and risk provides an opportunity for design and scholarship at the highest levels.

- **Health** – as an affluent society, our nation recognizes the importance of healthcare for its citizens. We also have a strong moral imperative to improve the quality of life in developing countries. In fact, with globalization the risk to our nation due to infectious diseases is growing (e.g. ebola, HIV, chikungunya). However, healthcare costs are high, and extraordinary healthcare disparity exists.
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- Technology – we are in a technological society. This enhances globalization; moreover, data creation and appropriate analysis can improve our abilities to affect positive change.

TFAC next reviewed unit strategic plans to appreciate the vision and goals of school deans, departments and unit directors. We then met with a series of thought- and action-leaders within and outside Tulane to explore the major questions in high-impact areas of scholarship to identify existing and potential collaborative opportunities.

As we evaluated Tulane’s strengths, we kept in mind the fact that Tulane is a small AAU Research I university, and may suffer from a lack of economies of scale that exist at larger universities. As such, we were guided by the question

‘How can Tulane adapt to a changing world, while providing the best opportunities for our students?’

As described in detail below, it is clear that fostering a collaborative environment in key areas of strength is a path forward, because it will dynamically create interdisciplinary research that draws together our community in manners that are difficult for other universities. While small universities/colleges cannot provide interdisciplinarity at our level because of insufficient breadth, lack of professional schools, and insufficient resources; larger schools are frequently ‘siloed’ and don’t emphasize undergraduate education linked to research and career development.

In the analysis that follows, we demonstrate that Tulane is the right size to be successful in targeted areas of collaboration. The collaborative areas emphasized in this report are obvious because we have competitive advantages that set Tulane apart from many of its peer institutions. These are:

1) The Environment, Energy and Resilience,
2) Global Studies – Gulf Region/Latin America/Africa, and
3) Health and Bioinnovation.

Pursuing this approach will advance our position as a vibrant intellectual environment that fosters interactions between undergraduates/graduate students and faculty members. This provides very strong mentorship through these contacts with faculty members. We will thus be extraordinarily well equipped to develop students for careers in a changing world.

The Structure of the Remainder of this Report:
- Section III provides an overview of each of Tulane’s three collaborative strengths. Tulane’s distinctive approaches to scholarship and education are also conveyed. This section is intended to articulate the broad vision for expanding Tulane’s collaborative enterprise, and the interrelationships that exist with several distinctive approaches to education and scholarship.
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- **Section IV** provides a brief description of the relationship between the goals and recommendations of the Task Force on Academic Collaboration and the Task Force on the Undergraduate Experience. This section describes how the collaborative environment can significantly improve our students’ experiences while at Tulane and their career preparation.

- In **Section V** we provide a far deeper analysis of the collaborative areas of strength. This presentation includes descriptions of assets, with **specific recommendations** of tools and strategies to enhance the collaborative potential.

- Likewise, in **Section VI** we provide detailed analyses of Tulane’s distinctive approaches to scholarship and education. This section provides a detailed list of assets that clearly offers a rich environment for our faculty and students. While these are generally areas of scholarship in their own right, they also significantly support and improve Tulane’s environment for collaboration.

- Finally, in **Section VII** we provide a summary of this report and recommendations.
III. OVERVIEW

In this section we provide a description of A) the collaborative strength areas that TFAC has identified as being most promising. In addition we identify B) Tulane’s distinctive approaches to education and scholarship. These are combined in C) to develop the path for enhancing collaboration.

A. TULANE UNIVERSITY’S COLLABORATIVE STRENGTH AREAS

This section outlines the three major strength areas of collaborative scholarship that currently exist at Tulane University. These are:

1. Environment, Energy and Resilience;
2. Global Studies: Gulf Region, Latin America and Africa, and
3. Health and Bioinnovation.

TFAC identified these areas based upon the existence of interdisciplinary strength and potential for national leadership in research and education. In addition, several features of these areas resonate with the “Only in New Orleans, Only at Tulane” motto.

Figure 1: Representation of Tulane’s three primary areas of collaborative excellence:

1. Energy, Environment and Resilience,
2. Areas Studies: Gulf Region, Latin America and Africa, and
3. Health and Bioinnovation.

These areas distinguish Tulane University and are recommended for consideration of advanced support.
Below are brief descriptions of each of these areas, which are shown graphically in Figure 1. Common goals and approaches exist in portions of these collaborative areas, leading to synergy that can help to create a sense of community.

**COLLABORATIVE STRENGTH 1: THE ENVIRONMENT, ENERGY AND RESILIENCE**

As a city embedded within an at-risk coastal landscape of globally relevant culture, rich energy assets, and prized natural resources, New Orleans serves as an exceptional natural laboratory for addressing many of the grand challenges of the 21st century. As the leading research university in New Orleans, Tulane is positioned to forge innovative pathways towards a viable balance between growing demands for energy, environmental stewardship, and a resilient society. Tulane already supports a rich portfolio of high impact programs defined by vibrant collaborative scholarship on issues ranging from water sustainability and energy security to trauma and disaster resilience. Our faculty are well positioned to study energy and environment hand-in-hand with the petroleum industry in our region and consistent with state and federal interests in issues ranging from coastal sustainability to the development of liquefied natural gas. Our range of expertise sets us apart from others in our region because of our emphasis on the sociological and public health aspects, as well as physical and biological aspects, of environmental science and energy. Increasing strength through timely investment and coordination will enable Tulane to sustain success and leadership as well as capture surging resources for research centered on the Gulf coast and other vulnerable coastal regions.

**COLLABORATIVE STRENGTH 2: GLOBAL STUDIES – GULF REGION/LATIN AMERICA/AFRICA**

Global scholarship represents a longstanding cornerstone of excellence at Tulane University. While Tulane faculty study and teach in many countries around the world, the concentration of effort and resources in the Gulf Region, Latin America and Africa stand out as established, highly regarded foci of excellence. Our academic presence in the Americas, particularly the Gulf Region and Latin America, has earned global name recognition and an excellent national profile. Long funded by competitive federal grants and generous philanthropy, the scholarly community focus on Latin America has reached critical mass, established world-class resources and achieved international recognition. A growing cohort of faculty members are focused on the Gulf Region, with involvement in broad-ranging issues from musical heritage to public health. In Africa, Tulane faculty members work in at least 30 countries on broadly interdisciplinary topics including health, energy, economics, government, policy and capacity building. The confluence of our vibrant international profile in the Gulf Region, Latin America and Africa, a strong asset base already in place, and the opportunity to address issues of importance affords unusual opportunity for growth and impact.

**COLLABORATIVE STRENGTH 3: HEALTH AND BIOINNOVATION**

Health is a major focus of research, scholarship and education at Tulane University. Research in this area benefits from a highly interdisciplinary approach that requires shared knowledge, tools, resources and skills from faculty across the university. Well known and highly regarded degree programs are offered in this area for undergraduate, graduate and professional students, and health-related research comprises more than 80% of our
sponsored projects portfolio. Research in the health sciences is tightly linked to Bioinnovation, a growth area at Tulane with the goal of translating biomedical and engineering research to develop marketable medical technologies and devices. This area draws together faculty and students from across the university and is of increasing importance to federal agencies. Our strong Bioinnovation research and graduate training program provides synergy with Tulane’s undergraduate programs by engaging students in design thinking and entrepreneurship. This reinforces other innovation and entrepreneurship efforts on campus that have attracted support from private sources and competitive federal agencies, and benefits from resources and collaboration with the Taylor Center and the state-funded New Orleans Bioinnovation Center.
B. TULANE’S DISTINCTIVE APPROACHES TO EDUCATION AND SCHOLARSHIP
This section describes the many areas in which faculty members and students at Tulane University are engaged in scholarship and outreach of a highly distinctive nature. These areas are also of special interest because they provide extraordinary resources that resonate and advance our collaborative areas. As such, faculty members and students engaged in these approaches are likely to benefit from support for collaborative endeavors.

1. Contemporary Methodologies – Design Thinking, Computation and Analysis
Contemporary methodologies demonstrated by design thinking, computation and analysis are vibrant areas of scholarship and education at Tulane that advance our collaborative mission. These innovative strategies are essential to our efforts to address complex problems. For example, design thinking is grounded in human-centered design principles, and design-thinkers aim to create products, processes and services that are effective, viable, affordable and desirable. Likewise, computation and analysis are key components of modern engineering, scientific and business activities. Research and tools in this area foster synergistic interactions that link theory, experiments, and simulation. These interactions significantly enhance Tulane’s collaborative research by helping to elucidate fundamental processes, visualize and control systems and make meaningful conclusions from large and disparate datasets.

2. Community Engagement, Social Innovation and Entrepreneurship
For over 175 years, Tulane has worked to strengthen the regional, national and global communities it serves. As a core component of its service mission, Tulane is the only research-intensive university to require undergraduate curricular public service as a
graduation requirement. The culture of community engagement in Tulane’s graduate programs is also strong, and many graduate programs require field-based placement and service with students making an impact locally, regionally and globally.

Tulane is further at the forefront of American higher education in the integration of social innovation, community engagement, and design thinking into its core institutional mission and culture, as evidenced by the establishment of the Phyllis M. Taylor Center for Social Innovation and Design Thinking. This provides a human-centered empathic approach to addressing social needs that engages experts and the actual beneficiaries of proposed innovations, whether they are products, processes, or services. Design Thinking is emerging as a useful complementary approach to the traditional disciplines of the Liberal Arts, Sciences, and Engineering, which have had historical success at Tulane. As an approach, it therefore amplifies Tulane’s commitment to innovation in problem solving by bringing together the liberal arts (humanities, social sciences, and the arts) and the health and physical sciences to impact research and scholarship in areas of strength and demonstrated excellence across the university.

3. New Orleans as a Cultural Archive and Laboratory
New Orleans as Cultural Archive and Laboratory (NOCAL) is a collaborative initiative that views New Orleans and the Gulf Coast region as an archive documenting a unique cultural heritage, and as a laboratory within which that heritage is continually engaged. NOCAL encourages innovation and problem solving approaches that synergize the humanities, social sciences, arts, physical sciences, and professional schools around complementary elements of city, culture, and community. As a networked initiative within and outside Tulane, NOCAL promises a collective impact toward Tulane’s mission of creating and circulating new knowledge.

4. Business, Economics, Public Policy, and Regulatory Innovation
Louisiana, and New Orleans in particular, has historically been at the center of disasters, some natural and some man-made. Such events threaten the very foundation of civil society in the state and city. Yet, we have continued to survive and, in fact, thrive. As the economic and population center of the state, New Orleans has played a large role in crafting the public policies and regulations that drive our ability to rebound and improve regardless of the situation with which we are faced. Tulane is already a major player in the area of public policy and regulatory innovation. The strong interdisciplinary work performed at Tulane positions the university to continue this leadership.
C. THE PATH TO ENHANCING COLLABORATIVE RESEARCH AND SCHOLARSHIP

As shown in Figure 3, the foundation of the path to enhance collaborative research is based on the three interdisciplinary areas of collaborative research excellence that are analyzed in detail in Section IV:

1. Environment, Energy and Resilience;
2. Global Studies: Gulf Region, Latin America, and Africa, and
3. Health and Bioinnovation.

However, Tulane’s collaborative enterprise depends upon vibrant interactions with Tulane’s distinctive, cross-cutting approaches to education and scholarship. These approaches, shown as the central portion of Figure 3, support and enhance collaboration, as described in detail in Section V. As such, collaborative approach to research and scholarship will benefit the Tulane community through all levels – from undergraduate to graduate and professional education.

Figure 3: Overview of the path to enhance collaborative research and scholarship.

We recommend strategic investment in three focus areas of collaborative excellence:

2. Global Studies: Gulf Region, Latin America, and Africa
3. Health and Bioinnovation

These support and are supported by four cross-cutting approaches:

➢ Contemporary Methodologies: Design Thinking, Computation and Analysis
➢ Community Engagement, Social Innovation and Social Entrepreneurship
➢ New Orleans as a Cultural Archive and Laboratory
➢ Business, Economics, Public Policy and Regulatory Innovation
IV. RELATIONSHIP TO OBJECTIVES OF THE TASK FORCE ON THE UNDERGRADUATE EXPERIENCE

At Tulane University, research and collaboration are intimately linked to undergraduate education. In TFAC’s analysis, we agree with the statement provided in the Report by the Task Force on Undergraduate Education:

“When we understand the workplace of the future, the communities of the future, as desperately seeking individuals who know how to solve the tough problems—hunger, poverty, environmental fragility, education, energy, public health—then it is our responsibility to help our students gain the expertise necessary to tackle these real life 21st century issues. To be successful in this brave new world students need to be flexible, nimble thinkers, able to move easily between theoretical, technological, practical, and although rarely articulated, human skills.”

The Task Force on Undergraduate Education has expressed a concern for a lack of coordinated interdisciplinary and collegial cross-school collaborations at Tulane University. In our report, we provide a description of the collaborations that already exist, and specific recommendations for their enhancement.

Furthermore, the Task Force on Undergraduate Education recommends that the quality of teaching of underclassmen be improved, through increased contact with tenured (or tenure-track) faculty members. We strongly agree. We believe, moreover, that the ability to attract and retain outstanding tenured and tenure-track faculty members who can best model and teach this level of expertise to our undergraduate students hinges on Tulane’s enhanced commitment to furthering interdisciplinary research and cross-school collaborations that will encourage such faculty to make Tulane their home. The many aspects of TFAC’s plan described in Sections V-VI provide meaningful collaborative engagement that will enhance the undergraduate experience, both directly and indirectly, by enticing exceptional faculty who will augment that experience. Studies have shown that the following characteristics of undergraduate education are correlated to post-graduate success:

1) Having (at least) one professor who makes a student excited about learning;
2) Feeling as though teachers care about the student, and
3) Working with a mentor.

Each of these areas will be improved through the constructive engagement suggested by our recommendations.

In summary, fostering our strength in collaborative research benefits Tulane’s distinctive approaches to education and scholarship, will provide a strong positive impact on our students’ education and will improve their likelihood of success after graduating from Tulane University.
V. DETAILED ANALYSIS OF TULANE’S COLLABORATIVE STRENGTH AREAS WITH SPECIFIC RECOMMENDATIONS

This section provides an in-depth view of the three areas of collaborative strength that the Task force has identified as being of primary importance for institutional investment:

1. Environment, Energy and Resilience;
2. Global Studies, Gulf Region, Latin America, and Africa, and
3. Health and Bioinnovation.

For each of these areas, we provide:

A. Rationale;
B. Assets and Resources, and
C. Specific Opportunities for Collaborative Enhancement.

As will be clear by this analysis, each of these areas satisfy the following principles:

1. The interdisciplinary field is of specific importance to Tulane and/or our region.
2. High impact problems are addressed.
3. Tulane University has existing or near critical mass of salient expertise that engages multiple units.
4. The collaborative area links to significant training/teaching, likely through the distinctive approaches to scholarship and education.
5. The collaborative endeavor leads to high quality scholarship and/or creative output.
6. A strong potential for external financial support and advocacy exists.
7. An administrative structure either already exists or is likely to be developed to facilitate advanced collaboration.

We are therefore confident that these areas demonstrate the interdisciplinary strength and potential for national leadership in research and education, and use this analysis to propose the tools and strategies needed to enhance these areas.
1. ENVIRONMENT, ENERGY AND RESILIENCE

A. Rationale:
As a city embedded within an at-risk coastal landscape of globally relevant culture, rich energy assets, and prized natural resources, New Orleans serves as an exceptional natural laboratory for addressing many of the grand challenges of the 21st century. As the leading research university in New Orleans, Tulane is positioned to forge innovative pathways towards a viable balance between growing demands for energy, environmental stewardship, and a resilient society. Tulane already supports a rich portfolio of high impact programs defined by vibrant collaborative scholarship on issues ranging from water sustainability and energy security to trauma and disaster resilience. Our faculty are well positioned to study energy and environment hand-in-hand with the petroleum industry in our region and consistent with state and federal interests in issues ranging from coastal sustainability to the development of liquefied natural gas. Our range of expertise sets us apart from others in our region because of our emphasis on the sociological and public health aspects, as well as physical and biological aspects, of environmental science and energy. Increasing strength through timely investment and coordination will enable Tulane to sustain success and leadership as well as capture surging resources for research centered on the Gulf coast and other vulnerable coastal regions.

B. Assets and Resources:
- Nationally recognized research and training programs in environmental health sciences, ecology and evolutionary biology, earth and environmental sciences, sustainable energy and energy policy, chemical and biomolecular engineering, disaster resilience and trauma.
- The Tulane-Xavier Center for Bioenvironmental Research (CBR) supports research and scholarly engagement on river, coastal and urbanizing deltas, and provides university-wide planning, coordination and implementation for a wide variety of research, education and outreach initiatives.
- The Tulane River and Coastal Center, as it develops on the new Riverfront Campus, will provide facilities and resources for thematic research and community outreach around river, coastal and urban environmental challenges at environment-energy-resilience interfaces.
- The Tulane City Center, which houses the School of Architecture’s applied urban research and outreach programs, supports projects related to urban and coastal environments and resilience like the 100 Resilient Cities Initiative, Hollygrove Greenline, Eco Pavilion Sustainable Exhibition, and a series of water management strategies featured in new design and construction.
- The Tulane Institute on Water Resources Law and Policy works to advance water law and policy relevant to urban, riverine and coastal environments.
• The Tulane Energy Institute provides educational and research opportunities to improve understanding of the integration of energy markets, policies, technology and the environment.

• The Taylor Center for Social Innovation and Design Thinking offers platforms to facilitate business innovations and economic development that address relevant concerns, such as the ongoing $1 million Tulane Water Challenge intended to spur market-driven solutions to coastal hypoxia.

• The Disaster Resilience Leadership Academy, a community-focused program on disaster response and leadership training, addresses operations, human factors, environment and analytics of disaster response and preparedness.

• The School of Science and Engineering is developing critical mass in research areas aligned with the energy and petrochemical sectors.

• Energy is a focus in the A.B. Freeman School, including energy policy work and analysis of the entire value chain of the energy industry. The Master of Management in Energy is a robust educational program offered by the School.

• The Environmental Law program of the Law School is among the nation’s top-ranked environmental law programs, notable for hosting nationally renowned scholarship and outreach including the Environmental Law Summit.

• Meaningful external partnerships are expanding our capacity. We have faculty jointly appointed with The Water Institute for the Gulf and with the Institute for Human and Machine Cognition. We recently established the Mississippi River Observatory, an autonomous water quality assessment instrument package, in collaboration with Woods Hole Oceanographic Institution and The Water Institute of the Gulf.

C. Specific Opportunities for Collaborative Enhancement:

1. Identify key areas for growth to facilitate further collaboration.
Tulane has fared well in attracting the available resource pool for research and training at the interface of environment, energy and resilience, but sustained success will require investments in strategic areas that set us apart. We recommend the following areas as within our current capacity and ripe for expansion:

• **Energy and water.** Growth here would enable Tulane to capture a high visibility leadership position in research on the interplay between energy production, water usage, and the environment. Our expertise in water management can serve as a springboard for Tulane to take a national leadership role in the energy/water nexus.

• **Natural Systems Engineering.** Including socio-environmental synthesis, growth here would build on nationally recognized programs on coupled human and natural systems in post-trauma coastal and urban landscapes.

• **Environmental Engineering.** Growth here would address a key gap in expertise at the university and would bridge complementary programs across six or more schools.
2. **Build faculty capacity.**
Sustained success, including the thematic growth described above, is linked to increased faculty capacity. The following mechanisms are recommended in particular:

- **Joint appointments** of faculty with external partners offer a promising approach to build both faculty capacity and valuable external relationships. Our success with an appointment in partnership with The Water Institute of the Gulf serves as a model. Success going forward will depend on smoothing the academic process for faculty hires that do not fall squarely in the interests of an academic department, but rather serve broader university interests.

- The **University Professor** mechanism would deliver critical breadth of expertise and leadership required to engender ambitious cross-disciplinary collaborations. As an example, a University Professor with a deep scientific understanding of hydrology could interface well with infrastructure engineering be a leader in design-oriented approaches that engage urban and social issues.

- The **Cluster Hire** mechanism is recommended in this focus area to build expertise in multiple units around a theme. In particular, a cluster-hire in **Natural Systems Engineering** would solidify expertise in environmental engineering and technology, urban design, and coupled human-natural system dynamics.

3. **Develop the Riverfront Campus.**
Initiated with the construction of the Tulane River and Coastal Center, the Riverfront Campus initiative should encompass a broader program that embraces the urban condition through outreach and community engagement. The new campus has the potential to establish a highly visible presence for Tulane expertise and leadership, and promises to offer a unique platform for development of innovative partnerships aiming to build a presence in the region.

4. **Expand professional education programs through two promising mechanisms:**
- **Joint degree programs** that link undergraduate and graduate training in strategic areas that deliver life-long value. Examples include an undergraduate engineering or environmental studies degree with the MBA or Masters of Management in Energy.
- **Professional Certifications** represent an area of growth opportunity. A **Certificate Program in Environmental Sustainability**, for example, would serve to build a much needed workforce, support economic development in our region, and expand our sphere of influence and opportunity. A series of Professional Certifications could be developed around the environment-energy-resilience nexus, many of which could effectively be offered through the CBR or the Riverfront Campus.

5. **Build meaningful partnerships to expand our expertise and increase opportunity.**
The Rockefeller Foundation, for example, concentrates on resilience and supports a number of New Orleans-based programs. There is opportunity for Tulane to link to these programs in a substantive way to increase our sphere of influence and opportunity. Likewise, enhancing the partnership with Woods Hole Oceanographic Institute will have similarly positive outcome.
6. **Create a locus of institutional support and activity.**

We recommend that a unified physical site for university and community activity in Environment, Energy and Resilience be identified and supported. This will bring together individuals with different areas of expertise, which will help to develop and improve collaboration. The current location of the CBR may be inadequate for its intended purpose. We anticipate that coordination of university support will continue to be organized through the Center for Bioenvironmental Research, supplemented by leaders in the SoM, SSE, SLA and SPHTM.
2. GLOBAL STUDIES: GULF REGION/LATIN AMERICA/AFRICA

A. Rationale:
Global scholarship represents a longstanding cornerstone of excellence at Tulane. While Tulane faculty study and teach in many countries around the world, the concentration of effort and resources in the Gulf Region, Latin America and Africa stand out as established, highly regarded foci of excellence. Our academic presence in the Americas, particularly the Gulf Region and Latin America, has earned global name recognition and an excellent national profile. Long funded by competitive federal grants and generous philanthropy, the scholarly community focus on Latin America has reached critical mass, established world-class resources and achieved international recognition. A growing cohort of faculty members are focused on the Gulf Region, with involvement in broad-ranging issues from musical heritage to public health. In Africa, Tulane faculty members work in at least 30 countries on broadly interdisciplinary topics including health, energy, economics, government, policy and capacity building. The confluence of our vibrant international profile in the Gulf Region, Latin America and Africa, a strong asset base already in place, and the opportunity to address issues of importance affords unusual opportunity for growth and impact.

B. Assets and Resources:
- Nationally and internationally recognized scholarship in multiple interacting disciplines: policy, health, energy, economics, anthropology, ecology and environment, art history, history, literature, cultural studies, sociology, political sciences, language, business, comparative law
- Critical mass of faculty; 11 endowed chairs in Caribbean and Latin American studies alone. Approximately 70 Latin Americanists on the faculty across the university.
- Highly regarded and distinctive educational programs for undergraduates, graduate students and fellows. The Freeman School joint degree programs with Latin American universities, the Trombone Shorty Academy and Fredman Music Business Institute serve as models.
- World-class collections and archives, including the Latin American Library, the Middle American Research Institute (MARI) Collection, and the Hogan Jazz Archive.
- Successful leadership and coordination by the Stone Center for Latin American Studies, the Center for Inter-American Policy and Research, the Cuban and Caribbean Studies Institute, the Middle American Research Institute, New Orleans Center for the Gulf South, Disaster Resilience Leadership Academy, and others.
- Major presence in public health and health policy, including educational programs in Cuba and Costa Rica; malaria eradication programs in Haiti; major research and education programs in Surinam, Argentina, and French Caribbean; Health Office for Latin America in Lima, Peru; high-impact work in Africa includes health sector reform, public health policy, HIV/AIDS prevention and treatment, malaria research and control, major role in control of the recent Ebola epidemic.
• Major presence in ecological studies of tropical biodiversity and conservation across the Gulf Region, Latin America and Africa.

• Collaborative scholarship across the university to explore the cultural heritage of the Gulf South and intersections with Latin America, the Caribbean and Africa that influenced our distinctive history and traditions.

• Major presence in musical cultures of the Gulf South through Music Rising at Tulane and related curricular and archival assets.

• Research and capacity building in at least 30 African nations. With an economy in sub-Saharan Africa that grows at 10% per year, and a continent that includes 11 of the 20 fastest growing countries in the world, Africa represents a tremendous opportunity for engagement in energy policy, health sector reform, education and capacity building, among other areas.

• A strong cohort of PhD students is attracted to Tulane for studies of the Gulf Region, Latin America and Africa in various disciplines.

C. Specific Opportunities for Collaborative Enhancement:

1. Build faculty capacity

Faculty capacity in Latin American studies can be reasonably described to have reached critical mass, with approximately 70 Latin Americanists across the university. Indeed, the critical mass in this area has been a clear recruitment tool for outstanding new faculty and doctoral students at Tulane University. By contrast, the faculty working in Africa is concentrated in areas of health care, health policy, business, energy and capacity building, and has not yet achieved critical mass. Likewise, faculty capacity in Gulf Region studies is strong and growing, with needs in key areas. Faculty capacity in Gulf Region, Latin America and Africa would be well supported through two mechanisms:

• **Visiting Professorships:** Visiting term appointments from experts around the world enhance Tulane’s national and international profile and help to fill gaps in our current capacity.

• **Endowed Chairs and Professorships:** The strong cohort of endowed chairs and professorships in Latin American studies serves as an example of how this mechanism builds institutional capacity, strength and reputation, and serves as a valuable recruitment tool. Additional chairs and professorships would strengthen our capacity to pursue scholarship focused on Africa and Gulf Region in areas in which we are already strong.

2. Expand educational programs

Expansion of educational programs in this area of research excellence would promote collaborative scholarship, strengthen training programs, and expand the network of in-country collaborations. The Freeman School, for example, has assembled a group of Latin American universities whose faculty hold Masters degrees but do not hold the PhD or other terminal degree. Freeman School works with a network of private business schools in Latin
America to which they send faculty for short, intensive courses. Graduate degrees are earned, and the program generates both revenue and valuable networking opportunities. This program in Latin America serves as a useful model for expansion within the region and to Africa.

A further opportunity in Africa includes a program recently proposed by Freeman School faculty to implement an appropriate and relevant educational curriculum in partnership with the University of Nairobi in Kenya to train African students for skilled employment, in particular to develop skilled engineers and technicians to manage, plan and operate a new healthcare infrastructure. The proposal, in collaboration with GE Healthcare Africa, includes a gap analysis and capacity building plan for workforce training at the University of Nairobi. This approach is exemplary of concepts that could be expanded to graduate degree-granting programs or certification programs to blend capacity building, scholarship and education in unique ways.

The powerful relationship between graduate educational programs and scholarly excellence is evident in the highly interdisciplinary studies overseen by the New Orleans Center for the Gulf South (NOCGS). Competitively awarded fellowships and new, highly interactive curricular programs have been vital to the development of scholarship in this area. While some NOCGS initiatives are relatively recently established, evidence indicates that success would proceed on an exponential curve with increased institutional focus.

Interdisciplinary doctoral programs represent an opportunity for expansion and growth. For example, the interdisciplinary PhD program in City, Culture and Community focuses on the Gulf Region and has interdisciplinary links among sociology, urban studies, architecture and social work. Opportunities abound to enhance scholarly excellence in Global Studies through the establishment and growth of graduate programs like these. Relatively simple budget-neutral approaches should also be applied to foster faculty collaboration and scholarship in this area, including cross-listing courses across the engaged schools and joint faculty appointments. These strategies support creative thought across common interest areas and foster collaborative scholarly products and proposals.

3. Support and enrich our world-class collections as major assets.
Our renowned collections, particularly in Latin American Studies, have untapped potential to elevate Tulane’s international profile for scholarly excellence. The Latin American Library is one of only three stand-alone Latin American collections in U.S. universities. It boasts robust rare book and manuscript holdings, including original letters by the Spanish explorer Cortes, and the Codex Tulane, a rare and unusual document dated circa 1550 that graphically depicts the genealogy of two royal families. The library hosts 120 visiting scholars each year. Likewise, MARI holds unique and valuable collections, supports original field research, and publishes scholarly work and trains scholars on Mesoamerica. Increasing their visibility with space for regular, rotating exhibitions would enhance the profile of these outstanding collections and others.
Likewise, the Hogan Jazz Archive represents a rare and distinctive asset whose presence and visibility merit expansion. The new Riverfront Campus may represent such an opportunity because of the beauty of its setting and the access to visitors to New Orleans. A possibility for consideration is the development of a “Tulane Collections” facility on the Riverfront Campus.

While our collections of rare historical materials are without peer, it is vital to maintain active programs of acquisition of contemporary materials. The ability to acquire, process and make these materials available to scholars is critical to maintaining our leadership role. For example, the Latin American Library presently holds one of the most complete research collections of pamphlets and ephemera related to politics and other contemporary topics, and one of the only photo archives devoted to the region. No other collection in an academic institution in the United States or elsewhere acquires, preserves and promotes the use of these materials in such a sustained and focused manner. We are poised here to fill a high-impact niche.

4. Expand alumni outreach to Latin America.
A “President’s Council on Latin America” is recommended for outreach to our many successful alumni. The Council could be valuable for direct philanthropy and for networking to expand collaborative opportunities in education and research.

5. Reinforce the locus of activity.
As with all collaborative endeavors, community building and maintenance is of critical importance. Current activities in cultural aspects of the Gulf Region and Latin America are focused on the Stone Center for Latin American Studies. The School of Public Health is the lead organization with regard to healthcare in the Gulf Region, Latin America and Africa. Likewise, the Freeman School leads the infrastructure activity in Africa. A centralized hub with coordinated interactions between faculty members, students and our community may help to reinforce and grow collaborations in these areas.
3. HEALTH AND BIOINNOVATION

A. Rationale:
Health is a major focus of research, scholarship and education at Tulane University. Research in this area benefits from a highly interdisciplinary approach that requires shared knowledge, tools, resources and skills from faculty across the university. Well known and highly regarded degree programs are offered in this area for undergraduate, graduate and professional students, and health-related research comprises more than 80% of our sponsored projects portfolio. Research in the health sciences is tightly linked to Bioinnovation, a growth area at Tulane with the goal of translating biomedical and engineering research to develop marketable medical technologies and devices. This area draws together faculty and students from across the university and is of increasing importance to federal agencies. Our strong Bioinnovation research and graduate training program provides synergy with Tulane’s undergraduate programs by engaging students in design thinking and entrepreneurship. This reinforces other innovation and entrepreneurship efforts on campus that have attracted support from private sources and competitive federal agencies, and benefits from resources and collaboration with the Taylor Center and the state-funded New Orleans Bioinnovation Center.

B. Assets and Resources:
• Tulane University is noteworthy in its combined presence and close interaction between the schools of Medicine, Public Health and Tropical Medicine, Science and Engineering, and the Tulane National Primate Research Center and a Regional Biocontainment Laboratory. Tulane University is the only institution in the nation with this combination of institutional resources.

• Tulane has nationally recognized research and training programs in:
  o Infectious Disease Prevention and Treatment;
  o Chronic Diseases including cardiovascular and pulmonary disease, hypertension, kidney disease, diabetes and obesity;
  o Cancer Biology and Treatment Innovation;
  o Health Disparities;
  o Sustaining Health and Wellness;
  o Neuroscience, particularly the successful undergraduate, master’s and Ph.D. training programs that link over 40 interdisciplinary faculty members, and
  o Education and training programs in Bioinnovation for undergraduates, graduate and professional students linked to faculty across the university.

• Tulane has major long-term NIH support for interdisciplinary centers of research and education, including
  o Tulane Hypertension and Renal Center of Excellence
  o “Building Interdisciplinary Research Careers in Women’s Health (BIRCWH)”
  o Infectious Diseases, including long-term support for:
    ▪ Tuberculosis Systems Biology Program
• Tuberculosis Research Unit
• Center for AIDS Research
• Simian Vaccine Evaluation Unit
  o Centers of Biomedical Research Excellence (COBRE). Tulane University has a long history of COBRE support, currently including programs in
  • Hypertension and Renal Biology;
  • Cancer Genetics;
  • Aging Studies
• Significant translational research exists through clinical trials, licensing and commercialization of drugs, devices, diagnostics and vaccine platforms, with many new developments in the product pipeline.
• Tulane has significant intra- and inter-state partnerships. These include
  o The Louisiana Clinical and Translational Science Center, an NIH-funded collaboration to foster clinical trials and product development;
  o Infectious disease research and training partnerships with Emory University, the University of Pennsylvania and LSU, and
  o Partnership with the Louisiana Public Health Institute to form a regional Electronic Medical Record Data Network. The effort is funded by the Patient Centered Outcomes Research Institute to conduct clinical trials and other translational research.
• Bioinnovation is a major potential source of research commercialization. This aspect is essential for research translation, student development and career preparation, faculty development, and has societal benefit important to our community and the region.
• Major NSF and foundation support exists for scholarship, education and training in Bioinnovation. This includes:
  o An interdisciplinary PhD program in Bioinnovation that is supported by an NSF IGERT (Integrative Graduate Education and Research Traineeship Program) grant;
  o An NSF funded Innovation-Corps (I-Corps) project that supports interdisciplinary teams each year to use “Lean Launchpad” approaches for biomedical design, and
  o Foundation support from VentureWell to develop an undergraduate design immersion program related to technology innovation and research commercialization.
• Recently renovated ballroom laboratory space in the J. Bennett Johnston Building on the downtown campus offers state-of-the-art ballroom laboratory space that provides a locus for interdisciplinary Health and Bioinnovation research clusters.
  o The Tulane Institute for Integrative Engineering for Health and Medicine (Ti²EHM) was developed between faculty members in the departments of Biomedical Engineering and Chemical and Biomolecular Engineering. The
TI²EHM was founded with the intention of coalescing engineering and biomedical sciences research to stimulate intellectual activity, sponsored research and graduate/post-doctoral training opportunities towards the creation of transformational medical technologies and devices.

- Tulane has highly regarded domestic and international programs related to maintaining and assessing health, including programs in genetic services, health screening, maternal and child health, psychosocial trauma, nutrition and obesity, program evaluation and assessment, and training programs offered around the world.

- Tulane has a strong environmental health presence in issues related to the Gulf oil spill, molecular toxicology, disaster preparedness and management.

- Tulane's regulatory law and policy expertise in the School of Law has a strong relationship to Health and Bioinnovation.

- The Murphy Institute’s Economics and Public Policy Track, which has a focus on health-care economics. Synergy could exist with the Freeman School in this area.

C. Specific Opportunities for Collaborative Enhancement:
To maintain and expand our prominence in Health and Bioinnovation, we recommend that Tulane University carefully focus on areas of strength for targeted growth. As such, our specific recommendations are:

1. Build faculty capacity.
Prominent interdisciplinary research, scholarship and innovation in the health sciences will be facilitated by a vibrant interaction between clinicians, scientists and engineers and their students and trainees. To do so, University Professors should be recruited of the following characteristics;

- One or more MD/PhD faculty members who have demonstrated a simultaneous dedication to research and clinical care. These faculty leaders will provide a bridge between the health sciences and science/engineering.

- One or more faculty members with a demonstrated capacity in biomedical technology development and translation to the marketplace. These faculty leaders will develop and advance our culture of applied sciences and technology transfer.

- Faculty “stars”, e.g., elected members of prestigious national honorific societies, longstanding winners of competitive federal grant applications. We note that existing faculty members could be promoted to this level, which would be important for recognition and retention.
2. **Strengthen infrastructure support**

It is critically important that the infrastructure for health-sciences related research be strengthened across the university. Up-to-date facilities and core equipment should be developed to support a strong research portfolio.

- Laboratory facilities are essential for our continued ranking as a Research I university and to attract and retain top-quality scientists. Of primary importance is the **renovation of Stern Hall and the Hutchinson Memorial Building**. These two buildings are singled out because they have a significant history of importance in health-related research, but have documented deficiencies that put our research capacity at risk. In addition, the layouts of these buildings are not conducive to collaborative science.

- Laboratory core facilities are essential for the research mission. Our current research portfolio makes the development and sustainability of these centralized resources difficult because we simply lack the number of faculty members necessary to lead their development, and their use is highly episodic. However, when critical mass exists these facilities will be largely self-sustaining.

3. **Promote collaborative research and action in “Healthy Living.”**

This would enhance collaborations across the University that would quantitatively assess methods of health improvement, develop policies and implementation processes that would be models for other cities. This is directly related to the CDC’s One Health Initiative that recognizes “that the health of humans is connected to the health of animals and the environment.” As such, we expect that it is important to:

- Enhance our capabilities in **clinical trials and translational research** that will have an impact on community health.

- **Develop collaboration in healthy living and policy.** This would link the health sciences, neuroscience, design thinking, social innovation and social entrepreneurship, architecture, environmental planning, behavioral/cultural studies, health economics, policy, and regulation. This approach is directly related to economic development that will promote personal and community responsibility and resilience, health, and wellness.

This university-wide initiative aligns with the goals of the Task Force for Undergraduate Experience.

4. **Training grant expansion**

Training grants should be specifically incentivized and supported in interdisciplinary topics. These mechanisms enhance research productivity as they foster ‘bridging’ across disciplines and thus enrich our culture of interdisciplinarity, especially in technology innovation, product development and entrepreneurship. In Health and Bioinnovation, support can come from:

- NIH T32 Pre- and Post-doctoral traineeship program
V. Tulane's Collaborative Strengths

- National Science Foundation Research Traineeship (NRT) Program (http://www.nsf.gov/pubs/2014/nsf14548/nsf14548.htm);
- Foundations such as the Coulter Foundation (http://www.whcf.org/about/the-coulter-foundation).

5. Create a locus of institutional support and activity.
As an area of interdisciplinary strength with existing and growing resources in all units, it is critically important that a centralized leadership program exist in order to sustain a consistent and non-duplicative investment. The focus of activity should be centered at the JBJ, and efforts should continue to improve access through physical and virtual means. We suggest:
- Neuroscience researchers on downtown, uptown and TNPRC campuses be integrated through a “Brain Institute” that combines already successful M.S. and Ph.D. programs with strong research programs, especially around basic nerve function and neurodegenerative disease.
- Health and Bioinnovation coordination should continue through the Health Sciences Leadership Council, supplemented by leaders in the SoM, SSE and SPHTM.
VI. Detailed Analysis of Tulane’s Distinctive Approaches to Education and Scholarship

In this section we identify the key approaches of Tulane’s community that are used to advance education and scholarship in a cross-cutting, interdisciplinary manner. As a university that already values interdisciplinary interaction, it is not surprising that many of these approaches have already demonstrated success in breaking down barriers between departments. Here we highlight four areas of particular importance:

- Contemporary Methodologies: Design Thinking, Computation and Analysis.
- Community Engagement, Social Innovation and Social Entrepreneurship;
- New Orleans as a Cultural Archive and Laboratory (NOCAL);
- Business, Economics, Public Policy and Regulatory Innovation

For each of these approaches we outline the:

A. Rationale;
B. Assets and resources and their relationship to collaborative strengths.

From this analysis, it is evident that a focus on collaborative endeavors will rely on, and benefit, these distinctive approaches to scholarship and education. For this reason, a broad number of faculty members and students will benefit from the proposed investments in collaborative research and scholarship.
1. CONTEMPORARY METHODOLOGIES: DESIGN THINKING, COMPUTATION AND ANALYSIS

A. Rationale
Contemporary methodologies clearly have an exceedingly strong interaction with our focus on collaborative research and scholarship. These relationships are represented by design thinking, computation and analysis, which are vibrant areas of scholarship and education at Tulane that advance our collaborative mission. These innovative strategies are essential to our efforts to address complex problems. For example, design thinking is grounded in human-centered design principles, and Design Thinkers aim to create products, processes and services that are effective, viable, affordable and desirable. Likewise, computation and analysis are key components of modern engineering, scientific and business activities. Research and tools in this area foster synergistic interactions that link theory, experiments, and simulation. These interactions significantly enhance Tulane’s collaborative research by helping to elucidate fundamental processes, visualize and control systems and make meaningful conclusions from large and disparate datasets.

B. Assets and Resources and their Relationship to Collaborative Strengths.
- Phyllis M. Taylor Center for Social Innovation and Design Thinking provides strength in teaching and research using Design Thinking.
  - Social Innovation and Social Entrepreneurship (SISE) Fellows create links across much of Tulane’s community by including faculty members from Biomedical Engineering, Global Health Systems, Ecology and Evolutionary Biology, Law, Communications and Teacher Certification.
  - Tulane School of Architecture (TSA) has teaching and research focused on the design of the contemporary built environment. Faculty research interests engage collaborative issues of the coastal and urban environments, public health, and cultural studies. TSA’s City Center pursues public interest design and education. It makes its design research, education and visioning services available to the university and to community partners. The new facility in Central City provides a setting for interdisciplinary work between the uptown and downtown campuses.

- New graduate and undergraduate programs such as the Interdisciplinary PhD program in Bioinnovation, the NSF-sponsored Innovation Corps site and the VentureWell Innovation and Entrepreneurship Program demonstrate that Tulane University has activity in Design Thinking that is supported by the federal government and foundations.

- The reestablished Department of Computer Science follows a new paradigm of "computer science at the interface." Its faculty members are involved in research collaboration with other basic sciences, engineering, business, and the health and social sciences. Specific projects that relate to Tulane’s Collaborative Strengths are:
1. Environment and Energy:
   o Embedding preferences in work-practice simulations in the context of oil spills mitigation (with Department of Psychology).
   o Multi-agent modeling for energy demand in the smart grid (with School of Business).
   o Adaptive Response Algorithms for Renewable Energy (with School of Business).

2. Global Studies:
   o Database development for New Orleans community data that will allow various kinds of queries and analyses (with School of Public Health and Tropical Medicine, and Mathematics).

3. Health and Bioinnovation:
   o Shape matching tasks in the analysis of confocal images to quantify membrane protein trafficking behavior (with Department of Chemical and Biomolecular Engineering).
   o Drug and Compound Screening (with Department of Tropical Medicine and Vector-Borne Infectious Diseases Research Center).
   o Computational Immunology (Department of Biochemistry).
   o Computational models of auditory spatial attention (with the Department of Psychology).
   o Computational aspects for imaging technology for identification of pathophysiological tissue samples. (with Biomedical Engineering and Bioinnovation).

- The **Center for Computational Science** (CCS) provides a central catalyst for university-wide research that involves computer simulation and computational science. This provides a venue for researchers involved in theory and/or experiments to find collaborators in areas of computation. Collaboration has spanned all schools in the university. Staff members train faculty and students in high-performance computing (HPC) methods that are critical to many aspects of collaboration. Specific funded projects since 2010 that relate to Tulane’s Collaborative Strengths are:

1. Environment and Energy:
   o SEES Fellows: Modeling for sustainability in a changing environment.
   o The Environmental Effects of an Oil Spill on Blue Crabs in the Gulf of Mexico and the Dynamics of Recovery: Integrating Oceanography and Molecular Ecology (with Earth and Environmental Biology).

2. Global Studies:
   o Development of a Distributed Data Archival, Analysis and Visual System for Data Intensive Collaborative Research (with Biomedical Engineering and Mathematics).
3. Health and Bioinnovation:
   o Predicting vector-borne virus transmission dynamics (with Mathematics, LSU Veterinary Medicine).
   o Quantifying Model Uncertainty of Accurately Forecasting the Spread of Infectious Diseases (with Mathematics and Los Alamos National Laboratories).
   o Modeling the Effectiveness of Interventions in Stopping the Spread of Vector-Borne Diseases (with Mathematics).
   o An Agent-based Model of Mosquito-Host Encounter Rates (with Mathematics and Epidemiology).
   o Neuromechanics and Dynamics of Locomotion (with Mathematics).
   o Collaborative Research: Dynamics of Elastic Biostructures in Complex Fluids (with Mathematics and NYU, Washington State, UCLA).
   o Graduate Training in Mathematical and Computational Biofluids (with Mathematics and Biomedical Engineering).

- The School of Science and Engineering (specifically Computer Science) has a strong relationship with The Institute for Human and Machine Cognition (IHMC) in Pensacola, FL. The IHMC is a not-for-profit research institute that fosters collaboration with academia, industry and government with research areas including artificial intelligence, cognitive science, adjustable autonomy, linguistics, big data and machine learning. A proposed interdisciplinary center at Tulane would attract faculty in biomedical engineering, computer science, neuroscience, and psychology to study the interface between human behavior and technology.

- Tulane’s Cypress Supercomputer – Currently one of the top 500 supercomputers in the world, this resource allows for high performance computing and analysis of big data that is critical to many research disciplines, with applications in genomics, the environment, meteorology, remote sensing, artificial intelligence, and digital media.
2. COMMUNITY ENGAGEMENT, SOCIAL INNOVATION AND ENTREPRENEURSHIP

A. Rationale:
For over 175 years, Tulane has worked to strengthen the regional, national and global communities it serves. Following the devastation of Hurricane Katrina, the university articulated a significant commitment to community engagement and public service. Tulane has earned national recognition for this engagement, regularly ranking on the President's Higher Education Community Service Honor Roll since 2006, as recipient of the Carnegie Community Engagement Elective classification in 2008, and as one of the US News and World Report's Best Colleges for Service Learning since 2010. As a core component of its service mission, Tulane is the only research-intensive university to require undergraduate curricular public service as a graduation requirement. Coordinated by the Tulane Center for Public Service, the university offers over 280 service learning courses that enroll more than 3000 students and represent 62,000 service hours each year. The culture of community engagement in Tulane’s graduate programs is also strong, and many graduate programs require field-based placement and service with students making an impact locally, regionally and globally.

Tulane is further at the forefront of American higher education in the integration of social innovation, community engagement, and design thinking into its core institutional mission and culture, as evidenced by the establishment of the Phyllis M. Taylor Center for Social Innovation and Design Thinking. Key insights derived from design thinking—which is considered a human-centered empathic approach to addressing social needs that engages experts and the actual beneficiaries of proposed innovations, whether they are products, processes, or services—are at the heart of much of the community engagement undertaken by faculty. As such, Tulane connects transformative research, innovative teaching, and real-world projects to discover the most innovative and effective tools, processes, and practices for social improvement. Design Thinking is emerging as a useful complementary approach to the traditional disciplines of the Liberal Arts, Sciences, and Engineering, which have a long record of historical success at Tulane. As an approach, it therefore amplifies Tulane’s commitment to innovation in problem solving by bringing together the liberal arts (humanities, social sciences, and the arts) and the health and physical sciences to impact research and scholarship in areas of strength and demonstrated excellence across the university.

B. Assets and Resources and their Relationship to Collaborative Strengths.
Tulane’s distinctive approaches to Community Engagement, Social Innovation and Entrepreneurship have already created direct and positive interactions with collaborative strength areas.

Recent coalescence of support has been created through the Phyllis M. Taylor Center for Social Innovation and Design Thinking:
- The newly established Center, together with Social Innovation Engagement program in the Center for Engaged Learning and Teaching (CELT-SI), offer Design
Thinking outreach, the SISE Undergraduate Minor curriculum, Graduate certification, cross-university collaborations, and community partnerships.

- The intended graduate-level certificate in Social Innovation affords an opportunity to effect social impact on a large scale.
- Collaboration is fostered through eight cross-disciplinary endowed professorships of social entrepreneurship.
- The Taylor Center, and a MakerSpace may foster the incubation of student and alumni social venture ideas and link this with Tulane’s extensive curricular support and programming.
- Taylor Fellows expert-in-residency program brings outside collaborative expertise to campus.

Specific relationships to our Collaborative Strengths are as follows:

1. **Environment, Energy and Resilience:**
   - The School of Social Work’s Traumatology Institute and the Institute for Psychosocial Health are renowned, as are programs from School of Medicine’s Department of Child and Adolescent Psychiatry, for addressing trauma throughout the city and greater Gulf South Region.
   - Through its law clinics, faculty and students from the Tulane School of Law regularly assist and empower community residents. Various certificates of specialization are also available, for example, in sports law and environmental law.
   - Unique programs such as the Disaster Resilience Leadership Academy masters/professional degree represent one-of-a-kind assets. This is a significant resource that benefits our collaborative strength in Resilience.

2. **Global Studies:**
   - Academic Community Engagement through the Center for Public Service (CPS), Service Learning courses, and the Social Innovation and Social Entrepreneurship undergraduate program brings our students and faculty members in direct contact with our community.
   - The School of Architecture’s Tulane City Center is changing the landscape of the city, with engagement in public interest design and education, architecture curriculum and design of the human-built environment, and outreach to inform the local community.
   - The School of Liberal Arts’ New Orleans Center for the Gulf South is making Tulane University the epicenter for study of the cultural heritage of the Gulf South region. Its programs, such as the Music Rising Project, the Trombone Shorty Academy and the Fredman Music Business Institute, engage and empower the community in direct and measurable ways. The Theatre and Dance Department’s MFA in Interdisciplinary Dance Performance provides graduate opportunities for scholarship directly linked to creative practice.
   - The Freeman School of Business, through the Levy-Rosenblum Institute and other programs, provides offerings in social entrepreneurship and economic development
that are building local and regional capacity and contributing to regional economic growth.

- The recently established interdisciplinary PhD programs in **City, Culture and Community**, Bioinnovation, and in Aging, bring together the Schools of Liberal Arts, Social Work, Medicine, Public Health and Tropical Medicine, Architecture, and Science and Engineering.

- Strong interdisciplinary programming exists across many schools through such important intellectual venues as the **New Orleans Center for the Gulf South** and a certificate program in the Department of English in Documentary Literary Studies.

### 3. Health and Bioinnovation:

- The School of Public Health and Tropical Medicine (SPHTM) is recognized for **promoting local and global health**. The school’s Prevention Research Center (PRC) has played a salient role in the local changes to such activities as fresh food access and environments for physical activity. The Mary Amelia Women’s Center has fostered state and local initiatives for women and children’s health. Globally, SPHTM faculty members have applied research and training programs to **improve health outcomes on multiple continents with potential to infuse those research efforts with social innovation principles**.

- The School of Medicine has transformed community medicine and is considered a national innovator in community-based health clinics. Community Engagement Innovations such as the **Goldring Center for Culinary Medicine** have garnered national attention. At Liberty’s Kitchen, young people are taught strategies that are healthy and sustainable, enabling them to achieve personal and economic independence in adulthood. This also relates to Resilience.

- Social Innovation and Social Entrepreneurship (SISE) interactions have significantly improved the quality of biomedical engineering projects that are developed for individuals in our community with mental or physical disabilities. This strong interaction benefits our community of scholars in Health and Bioinnovation.
3. NEW ORLEANS AS CULTURAL ARCHIVE AND LABORATORY (NOCAL)

A. Rationale:
New Orleans as Cultural Archive and Laboratory (NOCAL) is a collaborative initiative at Tulane that views New Orleans and the Gulf Coast region as an *archive* documenting a unique cultural heritage, and as a *laboratory* within which that heritage is continually engaged. NOCAL encourages innovation and problem solving approaches that synergize the humanities, social sciences, arts, physical sciences, and professional schools around complementary elements of city, culture, and community. As a networked initiative within and outside Tulane, NOCAL promises a collective impact toward Tulane’s mission of creating and circulating new knowledge. Assets and resources, below, represent a sample of strengths in and for undergraduate- and graduate-level collaborative programming at Tulane, focusing on New Orleans as the rich cultural archive that it is. NOCAL offers interdisciplinary programming that promises to significantly increase Tulane’s visibility and graduate student learning experience.

B. Assets and Resources and their Relationship to Collaborative Strengths.
- An interdisciplinary Environmental Studies Program coordinates scientific work being done on the riverfront with the humanities, social sciences, and arts, providing existing and future funding opportunities.

- **Engagements with city and regional culture**, strengthened since Hurricane Katrina, are already strongly in place, preeminently by way of the New Orleans Center for the Gulf South (NOCGS), including the Center’s Trombone Shorty Academy, Music Rising, and interdisciplinary Monroe Fellowships, providing existing and future funding opportunities.

- A critical mass of existing faculty who are being attracted through cluster hiring work in the **Digital Arts and the Humanities**, providing existing and future funding opportunities through the National Endowment for the Humanities and ACLS, with Latin America and the Caribbean being two regions specified.

- Tulane’s **rich on-campus archives**, such as Hogan Jazz, the Koch Botany Library, and Rare Books and Manuscripts, provide the basis for digital initiatives that are underway and ripe for expansion.

- Soon-to-be-completed renovations at the Howard Tilton Memorial Library will provide a new home for Tulane’s **Special Collections**. Supplementing the limited exhibition space available at Howard Tilton with such space elsewhere, perhaps on the riverfront campus, would increase the visibility of Tulane and its important collections for the community and visitors to New Orleans.
• Tulane has forged ties with off-campus archives, including the Historic New Orleans Collection, on collaborative projects such as the Shakespeare “First Folio” exhibition (Spring 2016).

• The new director at the Newcomb Art Gallery, the venue for the “First Folio” exhibition, is committed to community engagement across a wide range of programming.

• New Orleans continues to grow as a center for digital media production, and Tulane’s Digital Media Production program has emerged as an important interdisciplinary focus for research and teaching organized around this industry.

• Tulane has attracted talented and ambitious students into a number of graduate programs that cross disciplinary boundaries around the area of culture, broadly conceptualized.
  o Cross-disciplinary Linguistics PhD prioritizes place-based research on indigenous Louisiana languages.
  o City, Culture, and Community Ph.D. Program has a unique inter-, multi-, and cross-disciplinary focus that establishes:
    ▪ Primary links between disciplines (Sociology, Social Work, and Urban Studies);
    ▪ Primary links between schools (School of Liberal Arts and School of Social Work); and
    ▪ Web of research and academic affiliation with other schools (i.e., Architecture, Law, Public Health, School of Science and Engineering) and other disciplines within the School of Liberal Arts (i.e., Anthropology, Communication, Economics, Environmental Studies, History, Latin American Studies, Political Science).
  o Theatre and Dance Interdisciplinary Dance Performance MFA interfaces with diverse departments and schools across Tulane and may be modified to offer a multi-track terminal degree, the MFA in Community Arts, as a source of creative expression and problem solving, and as a basis for instructional links between related departments in the visual and performing arts, as well as collaborations between schools.
  o The Documentary Literary Studies Certificate for Master's students in English and related departments (History, Art History) allows students to pursue archival work related to their graduate research using Tulane archives, such as Rare Books and Manuscripts and the Amistad Research Center.
  o The Graduate Certificate in Social Innovation delivers a cross-university graduate-student experience to cultivate change-makers, people equipped to tackle pressing social problems with innovative thinking, a flexible attitude, and mindset to work within and transform large, complex institutions and complex multi-stakeholder partnerships.
We note that Tulane’s new Riverfront Campus provides a unique opportunity to leverage these assets by way of New Orleans’ status as a cultural port situated on the Mississippi River—a waterway that Mark Twain describes as “a book with a new story to tell every day.” A multi-purpose conference, performance, and exhibition center could provide a venue for interdisciplinary programs, cross-disciplinary symposia, arts productions, performances, and archival exhibitions that explore Tulane’s importance to the region. This would thus provide a natural link between New Orleans as a Cultural Archive and Laboratory and our collaborative strength in the Environment, Energy and Resilience.
4. BUSINESS, ECONOMICS, PUBLIC POLICY AND REGULATORY INNOVATION

A. Rationale:

Louisiana, and New Orleans in particular, has historically been at the center of disasters, some natural and some man-made. Long before Hurricanes Katrina and Rita inundated the city in 2005, Hurricane Betsy wreaked havoc in 1965. The 2010 BP oil disaster in the Gulf of Mexico brought unprecedented environmental and economic devastation to the region. The extent of the destruction perpetrated by these events, among others, threatened the very foundation of civil society in the state and city. Yet, we have continued to survive and, in fact, thrive. As the economic and population center of the state, New Orleans has played a large role in crafting the public policies and regulations that drive our ability to rebound and improve regardless of the situation with which we are faced. Tulane is already a major player in the area of public policy and regulatory innovation. The strong interdisciplinary work performed at Tulane positions the university to continue this leadership.

B. Assets and Resources and their Relationship to Collaborative Strengths.

- The **Murphy Institute** is at the forefront of interdisciplinary work at Tulane, both in the academic substance within the Institute itself and the structures created between the Murphy Institute and other schools. The collaborative efforts of the Murphy Institute regarding public policy and regulation include:
  - Joint appointments with the Freeman School of Law for both a tenure-track professor and visiting assistant professor in the area of regulation;
  - The **Regulation Workshop** co-sponsored by the Law School in which national figures in the area of financial regulation presented works to professors and students;
  - The **Health Policy Working Group** in which professors and students from the Murphy Institute collaborate through lectures and presentations with professors from Global Health Systems, Economics Department, and the Business School;
  - The **Public Policy Working Group** in which professors and students from the Murphy Institute collaborate through lectures and presentations with professors from Economics Department and Law School;
  - The **Center for Public Policy Research**, which fosters multi-disciplinary research in the areas of regulation and coordination, health policy, public finance, and education, and
  - The **Center for Ethics and Public Affairs**, which supports interdisciplinary research, teaching, and scholarship on the broad topics of right and wrong, justice and injustice, citizenship and community, and the ethics of professions.

- The **Education Research Alliance for New Orleans**, under the direction of Douglas N. Harris, brings together the Economics Department, the Murphy Institute, and the Cowen Institute, along with a number of community partners, such as the Orleans Parish School Board, the Louisiana Recovery School District, and the Urban League of Greater New Orleans, to research education reform in New Orleans following Hurricane Katrina.
In addition to the aforementioned joint initiatives with the Murphy Institute, the Law School has a number of programs and professors that are leaders in the area of public policy and regulation, including:

- The Public Law Center, which hosts an summer International Legislative Drafting Institute;
- The Institute on Water Law Resources and Policy which analyzes public policy and regulation as related to water and natural resources, and
- Extensive faculty involvement with Louisiana State Law Institute, a statewide legal reform organization, in drafting new legislation.

The Disaster Resilience Leadership Academy falls within the School of Social Work and supports the study of regulatory innovations relating to disaster management, urban rebuilding, public health issues following disasters, and child and family issues following disasters.

The Newcomb College Institute provides research and teaching in areas of gender and family regulation, as well as public policy issues related to women and families.
VII. SUMMARY AND CONCLUSIONS

In this report of the President’s Task Force on Academic Collaboration, we have identified three major research themes that represent significant pillars of our national and international profile for collaborative scholarly excellence:
- Environment, Energy and Resilience
- Global Studies: Gulf Region, Latin America and Africa
- Health and Bioinnovation

Strongly interdisciplinary work in these areas is enriched by scholarship and education in four crosscutting distinctive areas:
- Contemporary Methodologies: Design Thinking, Computation and Analysis
- Community Engagement, Social Innovation and Social Entrepreneurship
- New Orleans as a Culture Archive and Cultural Laboratory
- Business, Economics, Policy and Regulatory Innovation

As documented herein, these areas share assets that can be summarized as follows:
- They address compelling scholarly questions and real-life problems of regional, national and global interest;
- They represent scholarly excellence in distinctive or “niche” areas that set Tulane apart;
- They include nationally recognized graduate and professional training programs;
- They exist as successful centers or other organizing units for interdisciplinary research, and
- Significant opportunities exist for external support from public and private sources.

We further propose common strategies and tactics to enhance interdisciplinary collaboration in the focus areas, including:

1. **Focus on strength areas.** Recognition of our key research strengths within the three focus areas will be critical to guide hiring and other investments. Likewise, the recognition of our niche areas should support the development of collaborative external partnerships to which we contribute our particular strengths.

2. **Build faculty capacity.** We have yet to reach critical mass in our areas of strength and focus, except perhaps in Latin American studies. We recommend building faculty capacity in the focus areas through mechanisms targeted at increasing interdisciplinarity. Such mechanisms include:
   - **University Professorships.** We recommend the appointment of individuals of unusual distinction and capacity for leadership as University Professors, that is, into a university-wide appointment outside a department or school. Such individuals should be academic stars prepared to galvanize interdisciplinary interaction in their area of focus.
• **Endowed Chairs and Professorships.** These are key to recruitment and retention of our most productive faculty, and can be used to target scholarly excellence in focus areas. Interdisciplinary scholarship can be facilitated through hiring into these positions of scholars who embrace a collaborative approach.

• **Cluster Hires.** The simultaneous hiring of multiple faculty members into an interdisciplinary research area, with appointments in various departments and schools, is a strategy that has been used successfully around the country. We are poised to employ this strategy because we have the newly renovated ballroom laboratory space in the J. Bennett Johnston Building, for example, that was created to co-locate interdisciplinary research clusters. This cluster hiring approach is recommended because faculty members would be recruited simultaneously to work together with the clear intention of scholarly productivity and education in an interdisciplinary area. It must be noted, however, that this approach is neither universally successful, nor universally appreciated. The path to tenure is considered high risk in some cases, because success of the individual depends in part on success of the group. Academic review and promotion strategies must be developed to take into account the contributions of these faculty members across departments and schools. Nevertheless, this approach offers extraordinary promise for improving collaboration and enhancing faculty diversity.

• **Joint appointments, across departments or schools.** Successful movement through the tenure process for jointly appointed faculty might require reconsideration of promotion criteria to include benefits to the university of interdisciplinary scholarship. This is likely to be most provocative if used for the hiring of junior faculty members.

3. **Expand educational programs.** Quality educational programs in interdisciplinary areas of high impact promote collaborative scholarship and strengthen our graduate training efforts. Substantial funding is available from federal and private sources to promote interdisciplinary graduate training programs; such traineeships can coalesce faculty members from diverse disciplines. As well, a rich opportunity exists to develop certificate programs for training the much in demand workforce in environmental engineering, coastal sustainability and other topics related to our unique environment.

4. **Develop infrastructure.** This recommendation applies broadly across the spectrum of infrastructure from shared instrumentation and research resources, to the use and display of major collections, to development of the Riverfront Campus, and to the much needed laboratory renovations on both downtown and uptown campuses. These efforts are vital for recruitment and retention of our most productive scholars.

5. **Enhance Contemporary Methodologies of Scholarship and Research.** Computer science, computational science and design are scholarly pursuits at Tulane that are also essential aspects of a modern repertoire that advance collaboration. Therefore, these areas...
are recommended for enhanced support, especially when there is a focus that aligns with the main collaborative areas defined by this report.

6. **Expand our capacity and expertise through meaningful partnerships.** Recognition of the limits of our capacity as an institution of relatively modest size underscores the need and value of establishing meaningful external partnerships. Collaborative research projects performed together with partner universities, research institutes, or industry could expand our capacity and increase the competitiveness of our projects and proposals. This activity can be encouraged through the research centers and through relatively modest investment in networking activities.

7. **Reinforce a locus of activity.** Each of the three pillars of collaborative excellence should have an identifiable physical presence for formal and informal interactions between members of our community. A ‘think-tank’ environment such as this will enhance engagement by bringing researchers and students together. This catalyzes engagement in big-picture problems by lowering the activation energy required to develop and sustain projects. This is not just a physical space issue - it is a human issue that also depends on strong and passionate leadership in the interdisciplinary area.

In addition, collaborative academic leadership will be key to the development and sustained productivity of an interdisciplinary research focus, especially because of the involvement of multiple departments, schools and units in a successful effort. In some cases new oversight structures should be envisioned, while in other cases existing organizational structures can be bolstered to assume the role. Examples of the latter include the Center for Bioenvironmental Research for guidance of the Environment, Energy and Resilience area, and the Health Sciences Leadership Council for leadership in the area of Health and Bioinnovation.