STATEWIDE RESEARCH PRIORITIES REVIEW PANEL
REPORT AND RECOMMENDATIONS

TO

THE LOUISIANA BOARD OF REGENTS

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Vice President for Research and Economic Development
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November 19, 2014
Statewide Research Priorities Review Panel
Report and Recommendations

Introduction

As explained in staff briefings, the Board of Regents’ 2011 Master Plan is organized around three major goals, including “fostering innovation through research in science and technology in Louisiana.” To pursue this goal, the Regents in 2012 established the Master Plan Research Advisory Committee (MPRAC), comprised of representatives from public and private research-focused universities across the State. MPRAC’s charge is to define priorities for investing in university research which show promise of leading to technology transfer and research commercialization.

To further the accomplishment of this goal, MPRAC, in collaboration with the Louisiana Department of Economic Development (LED) and the consultants LED engaged from Battelle during 2012-13, conducted analyses of priority research areas to identify a limited number of potential statewide foci. The 2013 Battelle report recommended the following five priority research areas:

- Advanced Manufacturing and Materials
- Clean Technology and Energy
- Coastal and Water Management
- Digital Media and Enterprise Software
- Life Sciences and Bioengineering

MPRAC promptly established five corresponding Task Forces to pinpoint opportunities for innovation within each designated area. Task Forces completed reports in October 2014, each recommending no more than three priority areas for research investment.

Dr. Kerry Davidson, Deputy Commissioner for Sponsored Programs, Board of Regents, charged the Statewide Research Priorities Review Panel with reviewing the Task Force reports and preparing findings and recommendations for submittal to the Regents. The panel met in Baton Rouge during November 16-19 and conducted interviews with representatives of each Task Force and two representatives from LED (see Appendix I). The panel’s review, scoring, and subsequent recommendations were based on these interactions and the “Criteria for External Review of Task Force Reporting” (see Appendix II).
EVALUATIONS

Task Force evaluations, based on criteria in Appendix II, are listed in the order of the strength of the reports and presentations to the panel. The panel recognizes that each area addressed by the five Task Forces is highly important for the future of academic research and economic development in Louisiana. The panel reviewed and evaluated priorities within each Task Force area separately and in combination; a single combined score is indicated for all priorities within each Task Force.

Long-term investment in selected priorities is essential. Within this context, given the dynamic nature of State and national needs and resources, the panel emphasizes the imperative to periodically reassess priorities within and across all Task Forces.

1. Advanced Materials and Manufacturing (95 points)

Foundational Sciences

The Task Force report and presentation convincingly conveyed the significant strengths that already exist in this highly competitive area, which participating institutions are maintaining and advancing, particularly in research and development related to metals manufacturing and materials. Accomplishments in the areas of polymers and composite materials and in biomaterials are also significant and continuing. The connection to FIRST Louisiana, the statewide science and technology plan, is solid. The Task Force offers a set of overarching strategic recommendations for further linking university-based and university-affiliated entities under a networked umbrella organization that would promote and expedite access to facilities and increase competitiveness for national resources and faculty recruitment. (15 points)

Collaborative Efforts

Multidisciplinary and multi-institutional collaborative efforts in this area are developing among the five major universities of LSU, Louisiana Tech, ULL, UNO, and Tulane. Further development that would include Loyola, Xavier, Southern-Baton Rouge, UL Monroe, and the LSU Ag Center is encouraged. There is an impressive list of current and potential industry partners, and further attempts to secure financial support from those companies is encouraged. (15 points)
Alignment: National Needs and Priorities

Alignment of the work in this area and its competitiveness with national needs, priorities, and potential funding is strong, particularly in the metals manufacturing priority area, and to a lesser degree in polymers and biomaterials. The use of the EPSCOR programs is commendable. While related disciplines have had some success in attracting faculty through the Board’s Endowed Chairs for Eminent Scholars program, it may be desirable to recruit a senior faculty member to provide overall leadership and direction of the combined efforts. This could help catalyze statewide coordination of the research efforts and also increase the competitiveness for additional resources. (30 points)

Research Commercialization and Translational Activities

Targeting of the research and development efforts in ways leading to research commercialization and translational activities that promote economic development in Louisiana represents an area for improvement. While there is significant potential in this area, the Task Force report throughout does not specifically couple the proposed efforts to Criterion 4. It is clear that there is sufficient interest and industry participation to effect increased financial support and to promote technology transfer and subsequent economic development. (35 points)
2. **Life Sciences and Bioengineering (90 points)**

Life Sciences and Bioengineering are critically important areas for research and development in Louisiana. Universities and special focus campuses in the State have a wealth of experience, and the need for development in health care, medical devices and pharmaceuticals is unquestioned, not only in Louisiana, but nationally and worldwide. As the population grows and ages, the needs will only expand. Research and development in these areas is well worth investment by Louisiana leaders.

**Need for Focus**

The Task Force wishes to see investment in three major areas: biotechnology; engineering of medical technology; and advancement of health and media informatics. Foci in agricultural research were also included among the biotechnology priorities. The panel believes that each selection is worthy of investment; the broad areas identified are logical choices and the amount of expenditures in both Louisiana and the U.S. provide compelling evidence for a very good return on investment. The panel also viewed positively the interest in workforce development, including a focus on professional master’s degrees.

The proposed initiative, however, needs clearer definition. Each area proposed for inclusion is very broad; the effort would benefit by being more narrowly focused in terms of research leading to innovation and more inclusive in terms of leadership among leading institutions. The Task Force concluded that the most effective way to achieve these goals would be establishment of a statewide organization, such as a Life Sciences/Biotechnology Center, that would assure meaningful coordination and interaction across all affected groups. Despite providing ample evidence of collaborations with many commercial groups, there was no evidence presented of meaningful interaction in planning the proposed Louisiana Biotechnology Center, or in approaching these groups to provide funding support for Center activities. The project would be enhanced by further interaction with industry.

**Foundational Sciences**

With clearer research targets and greater participation among the leading institutions, the proposed initiative should maintain and build strength in targeted foundational science and technology disciplines identified in the FIRST Louisiana S&T Plan. The biotechnology, health and engineering of biology areas all fall within FIRST Louisiana’s Biomedical Sciences area and should be able to attract funding from the agencies listed. **(15 points)**
Collaborative Efforts

With revisions noted above, the Life Sciences and Bioengineering initiative should promote focused multidisciplinary and multi-institutional collaborative research efforts. The presentation focused primarily on one university, and care must be taken to assure multi-institutional participation as the initiative is developed. (10 points)

Alignment: National Needs and Priorities

A clearer focus and greater inclusivity would well align the initiative with national priorities and needs, and thus make it competitive for federal funding. Health care nationally has become a major social, political, and moral issue as the population ages, and Louisiana should be an aggressive participant and leader in finding new ways to manage care and new methods of delivery, as well as new drugs and medical equipment. (30 points)

Research Commercialization and Translational Activities

The proposed initiatives should be able to sustain and advance targeted research commercialization and translational activities that promote economic development in Louisiana. This conclusion is predicated on the assumption that focus is narrowed to multi-institutional research strengths with the highest economic development potential. (35 points)
3. Digital Media and Enterprise Software (85 points)

The Task Force in this rapidly evolving and strategically important area divides priorities into Big Data and Analytics, Cybersecurity, and Enterprise Computing and Software Development. The report does an excellent job in relating the content of the report to the stipulated criteria for panel evaluation. The panel perceives that the Big Data and Analytics area has the best chance of achieving national prominence. While exciting progress and achievements are being made in all three areas, the panel concluded that there was an over-reliance on direct funding from the Board of Regents. The report presented an impressive list of commercial participants involved in the research area; this provides an opportunity for significant strengthening and expansion of the funding base.

Foundational Sciences

There has been impressive progress in Louisiana in building strength and in targeting the foundational science and technology in this discipline, consistent with FIRST Louisiana. This is particularly true for the area of Big Data and Analytics. There have also been impressive steps forward on Cybersecurity and Software Development. (13 points)

Collaborative Efforts

This area is inherently multidisciplinary and logically multi-institutional, particularly with respect to collaborative research. While ULL has taken the lead, the cooperating institutions are accomplishing significant related research and there are likely unexplored opportunities for further collaborations. For example, the pervasive nature of the underlying science is creating new research capability in the life sciences, the social sciences, and the humanities, as well as in the traditional related areas of mathematics, engineering, and the physical sciences. (15 points)

Alignment: National Needs and Priorities

There is certainly significant alignment and competitiveness with national priorities and needs. The efforts transcend many other areas in the natural sciences and engineering, medicine, and social phenomena. It is incumbent on Louisiana’s leaders to be aware of collaborative funding opportunities in all of these fields, as noted above. (30 points)

Research Commercialization and Translational Activities

With respect to Criterion 4 that addresses sustaining research commercialization that promotes economic development in Louisiana, neither the Task Force report nor the interview provided fully convincing arguments. There needs to be more attention directed towards developing
relationships with State and national industries and organizations to achieve clearer focus in this area. (27 points)
4. Coastal and Water Management Task Force (80 points)

Given the State’s geographic location, characteristics, and thriving related industries – such as oil and gas, fisheries, and tourism – coastal and water management plays a pivotal role in assuring Louisiana’s future development. Continually rising sea levels will inevitably pose major challenges for Louisiana and the nation, including maintenance and support of land near the ocean and other water sources. Additionally, maintenance of water quality may also become a significant problem for coastal areas as saline levels rise. It is vital that Louisiana find ways to manage these issues before they move beyond our control.

General Comments

The Task Force proposes three well-defined areas for investment: coastal resilience through next generation coastal science, engineering and management; water resilience management and technology; and coastal resilience and sustainable community planning and engineering. Consideration was given to technology transfer issues, as well as to workforce development. It appeared that the Task Force members had worked together well and were concerned about all areas of the State, not focused on one area or university alone. The three areas selected are important and well worth further study and investment.

Plans for involvement of corporate partners, however, were limited. The chances for success and good returns on investment would be improved considerably if commercial partners could be convinced to contribute to the research and development effort. One way to accomplish this would be to include research issues important to the Louisiana fishing industry and/or the offshore oil/gas industry; if successful, funding assistance from these industries could follow. These economic contributions are very important to Louisiana, and related industries would benefit from strong coastal and water management.

Foundational Sciences

The proposed plan will maintain and build strength in targeted foundational science and technology disciplines identified in FIRST Louisiana; as conceptualized, the initiative would fit into both the “Biomedical Sciences” and the “Materials” areas of FIRST Louisiana, particularly if fish industry issues were included. The foundational studies should lead to applied research that could contribute to economic development in Louisiana (15 points)

Collaborative Efforts

The initiative will promote targeted multidisciplinary and multi-institutional collaborative research efforts. It was made clear that Task Force members had jointly designed the proposed
program and that multiple institutions plan to participate. This would facilitate the program’s statewide reach. (15 points)

Alignment: National Needs and Priorities

Directions of the initiative are well-aligned and will be competitive with national priorities, needs, and funding. Coastal and water management are currently major issues across the United States. Rising sea levels and changes in climate and the environment will require major attention in the foreseeable future. Louisiana could lead in this area. (30 points)

Research Commercialization and Technology Transfer Activities

The proposed plan will sustain and advance targeted research commercialization and translational activities that promote economic development in Louisiana; this could be greatly enhanced, however, by additional interaction and inclusion of research topics that will be of interest to corporate partners. Changing water and salinity levels and exposure to pollutants are all major challenges to the fishing industry. Since this industry is of great importance to the State, it would likely greatly benefit by consideration of its issues by the Coastal and Water Management researchers, which in turn could contribute to Louisiana’s economic development. (20 points)
5. **Clean Technology and Energy (75 points)**

The October 31 Task Force report in this area originally identified five priority sub-areas: Oil and Gas Production, Fuels and Energy Storage, Power Generation, Renewable Bioenergy, and Catalysis. The November 17 afternoon interview narrowed the sub-areas to Oil and Gas Resources, Clean Tech Resources, and Energy Processes. Subsequently, during the evening of November 17, the panel received a list of three priority research commercialization areas—Non-Conventional Oil & Gas, Biofuels, and Power Production. The panel found it challenging to evaluate the relationship of the reports with respect to the criteria. There is little statewide evidence of coordination or focusing.

**Criticality of Area**

This is a critically important area for Louisiana and for the nation, particularly clean energy resources. The relationships coupling non-conventional oil and gas, biofuels, and electrical power production will ultimately have profound economic, social, and scientific effects on Louisiana industries and institutions.

**Foundational Sciences**

There is very significant work being done throughout the State, consistent with the FIRST Louisiana S&T Plan. Areas include co-generation of biomass and coal, improved solar cells, energy scavenging, ethanol production, and intelligent gas turbines. *(10 points)*

**Collaborative Efforts**

It is not clear from the report that there is a continuous functioning coordinating mechanism to promote multi-institutional collaborative research efforts. The Task Force report indicates that there is sufficient inter-institutional personnel to accomplish this if the necessary leadership comes forward. *(10 points)*

**Alignment: National Needs and Priorities**

There is certainly significant alignment with national priorities, needs, and funding. Collectively, through the Clean Power and Energy Research Consortium in Louisiana, there is a history of past federal and State funding of $750K per year. The report makes a very strong case for the importance of work in these areas. *(30 points)*
Research Commercialization and Translational Activities

With respect to Criterion 4, requiring targeted research commercialization and translational activities that promote economic development in Louisiana, the panel does not find a coherent strategy or plan to accomplish this objective. However, it is apparent that the commercialization potential and effects of the work being done by the Task Force institutions are immense. (25 points)

The Task Force Report and the interview would have benefitted from a timely and coherent discussion of the relationships with the Evaluation Criteria and specific suggestions for enhancement. Subsequent to the interview, the panel received additional input regarding the four evaluation criteria and suggestions for enhancement.
GENERAL RECOMMENDATIONS

The review panel was highly impressed with the dedication and hard work demonstrated by the MPRAC Task Forces in collaboration with the Louisiana Department of Economic Development. We also highly commend the Board of Regents of the State of Louisiana for realizing the significance of research and development issues to economic innovation and the future of the State. We believe that the areas addressed by each Task Force, in further refining the priorities recommended by Battelle, are of great significance to Louisiana and that targeted investments will lead to both short- and long-range returns for the citizenry of this State.

We highly recommend that the Board of Regents, MPRAC and its Task Forces, the Louisiana Department of Economic Development, the Louisiana Innovation Council, and related constituencies consider the following as economic planning and development in Louisiana continue:

1. As noted by several Task Forces, it is critically necessary to provide support for “proof of concept” and prototyping activities at the university level across all priority research areas with research commercialization and technology transfer potential. Proof of concept and prototyping funds help generate data that will enhance applications for external funding and, for studies ready for translation to commercial use, can assist with patenting, licensing, and obtaining data needed for small companies to move forward with product development. The Board of Regents already, through the Opportunities for Partnerships in Technology with Industry (OPT-In) Program, provides limited competitive funding; this program should be expanded, with additional funding leveraged through other State, private, and non-profit sources to ensure statewide reach and impact.

   The Technology Transfer and Commercialization Task Force should be charged to recommend to MPRAC, the Board of Regents, and the Louisiana Innovation Council an expanded proof-of-concept and prototyping initiative which leverages funding from multiple sources to support a statewide competitive program.

2. Since policies and approaches regarding technology transfer are integral to the success of research and development plans, the process must be comprehensible to industry and mutually protect the interests of universities and business. We understand that MPRAC’s Technology Transfer and Commercialization Task Force is currently collaborating closely with representatives of the Louisiana Department of Economic Development. This Task Force should, after a review of campus-based policies and approaches, recommend a set of best practices statewide
to the MPRAC, the Board of Regents, the Louisiana Department of Economic Development, and the Louisiana Innovation Council.

3. To ensure that constituencies across Louisiana are aware of MPRAC’s statewide work, a website should be developed by the Board of Regents, in collaboration with MPRAC and its Task Forces, to accomplish two purposes: (a) highlight priorities which emerge from the review panel’s report and Board action; and (b) communicate and advertise the priorities identified across all Task Force reports.

4. As suggested by the Technology Transfer and Commercialization Task Force, the panel recommends an interactive website to promote expanded relationships with industry by providing a searchable databank of all technologies available across Louisiana’s research institutions. While the initiative should be coordinated and managed on a statewide basis by the Board of Regents, collaboration with campus technology transfer officers as well as the Louisiana Department of Economic Development is critical. Given the scale of this activity and the collaboration required for it to succeed, the Board of Regents should create a full-time staff position to design, implement, and manage the databank.

5. Workforce development is an essential component of each initiative, and inclusion of professional master’s degrees will enhance the outcomes. Further, there should be interactions with community colleges to allow the addition of certificates to associate’s degrees in important research areas to help assure a workforce that can cope with varied needs of modern corporations in such areas as manufacturing, health care, water quality, energy, and computing. This will help minimize the existence of high-demand jobs in Louisiana which cannot be filled by Louisiana residents.

6. Each MPRAC research and economic development initiative should be designed to benefit the State of Louisiana and not one geographical area or university alone. Care should be taken to make each initiative truly collaborative and multi-institutional.

7. There are many outstanding corporate partners in the State. They should be engaged more meaningfully in planning, execution, and funding. Since a paramount goal of the program is to facilitate economic development of Louisiana, it is important to know that MPRAC strategies will help corporate partners meet their needs and objectives. Direct communications and interactions are essential. MPRAC is fortunate to have, as collaborating partners, representatives from the Louisiana Department of Economic Development. The Task Forces and respective
campuses should continue to take advantage of the expertise of LED to aid in strengthening relations with corporate partners.

8. The panel recommends that, for future funding cycles, the 20% of Workforce and Innovation for a Stronger Economy program (WISE) funds that are devoted to research be targeted to support, on public campuses, research priorities that the Board of Regents approves through the MPRAC-based statewide competitive process.

The review panel thanks the Board of Regents for giving us the opportunity to participate in the preparation of Louisiana’s research and economic development initiative. The combination and flow of events and collaborations – Master Plan Research Goal, MPRAC, Battelle, LED, the Louisiana Innovation Council – may not easily reoccur. We believe the prospects for targeted research leading to innovation are now very exciting; this is a momentous opportunity for Louisiana. We wish you the greatest success in these efforts.
## APPENDIX I

**Task Force Interviews: November 17, 2014**

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<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Panelists</th>
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<tr>
<td>8:30-9:30 a.m.</td>
<td>Coastal &amp; Water Management</td>
<td>Sam Bentley, Professor of Geology, LSU-Baton Rouge</td>
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<td>Nancy Rabalais, Executive Director, LUMCON</td>
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<td>David Borrok, Professor of Geosciences, UL Lafayette</td>
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<td>9:45-10:45 a.m.</td>
<td>Advanced Manufacturing &amp; Materials</td>
<td>Kenneth Sewell, Vice President for Research, UNO</td>
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<td>Stan Napper, Vice President for Research, Louisiana Tech</td>
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<td>Michael Khonsari, Professor of Mechanical Engineering, LSU-Baton Rouge</td>
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<td>11:00 a.m.-12:00 p.m.</td>
<td>Life Sciences &amp; Bioengineering</td>
<td>Laura Levy, Vice President of Research, Tulane University</td>
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<td>Donald Gaver, Professor &amp; Dept. Chair of Biomedical Engineering, Tulane University</td>
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<td>Gus Kousoulas, Director and Professor of Biotechnology, Veterinary, &amp; Molecular Medicine, LSU-Baton Rouge</td>
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<td>1:30-2:30 p.m.</td>
<td>Digital Media &amp; Enterprise Software</td>
<td>Ramesh Kolluru, Vice President for Research, UL Lafayette</td>
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<td>Matthew Lee, Senior Associate Vice Chancellor, Office of Research and Economic Development, LSU-Baton Rouge</td>
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<td>Sumeet Dua, Professor of Computer Science and Coordinator of IT Research, Louisiana Tech</td>
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<td>2:45-3:45 p.m.</td>
<td>Clean Technology &amp; Energy</td>
<td>Mark Zappi, Dean, College of Engineering, UL Lafayette</td>
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<td>4:00-5:00 p.m.</td>
<td>Representatives of the Louisiana Department of Economic Development</td>
<td>Quentin Messer, Assistant Secretary, Jenee Slocum, Special Projects Director</td>
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APPENDIX II

Criteria for External Review of Task Force Reporting

Each Task Force report should identify no more than three (3) priority research commercialization areas (e.g., wetland restoration, cybersecurity, drug delivery, light metal manufacturing, polymers, etc.) and develop action-oriented strategies for development and State investment in each. Task Forces may choose to develop a separate document for each priority area selected. External consultants will recommend those action-oriented priority initiatives which represent the strongest opportunities for achieving four objectives, rated below as follows:

1. Maintain and build strength in targeted foundational science and technology disciplines identified in FIRST Louisiana – 15%

2. Promote targeted multidisciplinary and multi-institutional collaborative research efforts – 15%

3. Demonstrate prospective alignment and competitiveness with national priorities, needs, and funding – 30%

4. Sustain and advance targeted research commercialization and translational activities that promote economic development in Louisiana – 40%

In formulating recommendations, external consultants will be charged to: (a) identify and recommend Louisiana priorities among research commercialization areas identified by each Task Force; and (b) identify and recommend Louisiana priorities across research commercialization areas covered by all Task Forces.

The report of external consultants will be transmitted to the Board of Regents, the Louisiana Department of Economic Development, and other stakeholders.