LOUISIANA BOARD OF REGENTS
BOARD OF REGENTS SUPPORT FUND

RESEARCH & DEVELOPMENT PROGRAM

REVIEW OF RESEARCH PROPOSALS SUBMITTED FOR FUNDING
CONSIDERATION IN THE
INDUSTRIAL TIES RESEARCH SUBPROGRAM (ITRS)

FY 2016-17 COMPETITION

March 2017

REPORT OF THE FINAL PANEL
BOARD OF REGENTS SUPPORT FUND
INDUSTRIAL TIES RESEARCH SUBPROGRAM
FY 2016-17

BACKGROUND INFORMATION

Twenty-eight research proposals requesting a total of $2,489,579 for the first year of work were submitted for funding consideration during fiscal year (FY) 2016-17 in the Industrial Ties Research Subprogram (ITRS) component of the Board of Regents Support Fund (BoRSF). Of the twenty-eight proposals submitted, two contained information of a confidential or proprietary nature. A three-phase evaluation process conducted exclusively by out-of-state experts was used to review these proposals.

REVIEW PROCESS

Phase I: In-Depth Mail Review

The twenty-eight proposals were reviewed for scientific and technical merit, as well as for their potential to contribute to Louisiana's economic development and diversification, by twelve out-of-state experts. The experts included two reviewers in each of the following five targeted industry sectors: Advanced Materials and Manufacturing; Life Sciences and Bioengineering (divided into two panels); Digital Media and Enterprise Software; Coastal and Water Management; and Clean Technology and Energy. Each subject area reviewer independently evaluated and prepared an in-depth evaluation form for each assigned proposal in the subject area.

Phase II: Reviewer Consensus Evaluation

After each reviewer independently assessed each assigned proposal, members of the various subject-area groups communicated with each other to arrive at a consensus ranking of proposals within each subject area. Proposals were placed in one of three categories:

1.   Priority One: Highly Meritorious Proposals Recommended for Funding;

2.   Priority Two: Meritorious Proposals of a Lower Priority; and

3.   Priority Three: Do Not Fund as Submitted.

All evaluation forms from out-of-state experts who participated in Phases I and II of the review process were available for each member of the final panel, along with all proposals submitted. Each member of the final panel read and studied each proposal and each evaluation prior to the final panel's meeting.

Phase III: Final Panel Review

Three out-of-state experts participated in Phase III of the review process and served on the final panel. The panel convened on February 2, 2017, to discuss Phase I and II subject-area evaluations, prioritize proposals, and develop funding recommendations. The final panel considered each of the twenty-eight proposals extensively and based its recommendations on the following criteria:

A.   Scientific and technical merit;

B.   Potential to enhance economic development and/or diversification in Louisiana;

C.   Evidence of private-sector involvement; and

D.   Evidence of innovation and ability to advance Louisiana's scientific, engineering, and/or technological bases.

The panel was informed that a maximum of $435,000 would be available in first-year funds for new research projects in the ITRS in FY 2016-17, and that money to continue the second and/or third years of multi-year projects recommended for funding would be budgeted separately from this amount. As a result of the final panel's deliberations, seven proposals were recommended for funding. These seven Priority One proposals are listed in **Appendix A**, immediately following the narrative section of this report. The final rankings and selections for awards were based upon individual ratings of the external reviewers (Phase I), the consensus rankings of the subject-area reviewer groups (Phase II), and the final panel's consensus evaluation (Phase III), taking into account the economic potential of each project.

Two other highly meritorious proposals considered at the final panel meeting but, for a variety of reasons, not recommended for funding are listed in **Appendix B**. The applicants whose proposals are listed in Appendix B should closely review the panel's comments. The final panel believes that these investigators should be notified of their good work and encouraged to revise and resubmit their proposals in the future, with the prospect that improvements in proposal content could ultimately lead to an award. These proposals, listed in Appendix B, should not be funded this year. The BoRSF would be better served by diverting any available funds not awarded to and/or unclaimed by Priority One projects to other R&D program component(s).

Four other proposals were considered meritorious by both the subject-area reviewers and the final panel, but insufficiently developed in one or more areas to be worthy of funding at this time (Priority Two).

Each of the remaining proposals, although meritorious in some respects, was deemed inconsistent with the goals and purposes of the ITRS and/or seriously deficient in one or more areas (Priority Three). The principal investigators who submitted these proposals are encouraged to submit them to other, more appropriate funding programs or to make significant revisions before considering resubmission to the ITRS.

The panel recommends that the Board of Regents commit funding for each new proposal for a maximum of three years, with renewal in the second and third years made contingent upon satisfactory progress as well as reconfirmation of continued external matching funding. External stipulations and institutional matching requirements applicable in general to the seven Priority One proposals are contained in **Appendix C (C.1).** The specific levels of outside funding required and detailed stipulations or conditions applicable to each proposal are included in the discussion of the seven Priority One proposals listed in

Appendix C (C.2). Summary statements have also been provided in **Appendix C** for each meritorious ITRS proposal ranked Priority One by the subject-area panels and considered by the final panel but not recommended for funding **(C.3)**, and Priority Two proposals **(C.4)**. These summaries include the following information for each proposal:

1.   Proposal number and title;

2.   Strengths and weaknesses of the proposal;

3.   Potential economic impact on Louisiana; and

4.   Recommended BoRSF funding level and funding stipulations, as applicable. (***Note:*** This information is provided only for the seven proposals recommended for funding and included in Appendix C.2).

A general statement on proposals ranked Priority III by the final panel is included in **Appendix C   (C.5)**.

The individuals who participated in Phases I and II of the review process are listed in **Appendix D**.

In-depth mail reviews will be provided as feedback to all applicants in July 2017.

FINAL PANEL RECOMMENDATIONS

To Phase I and Phase II Subject-Area Reviewers:

Reviewers should be commended for their performance in accordance with the guidelines set forth in the FY 2016-17 Request for Proposals.

To the Applicants:

Applicants should be commended for their efforts to obtain industrial support and for proposing research in areas with high economic potential. However, several of the proposals were not supported by strong research plans which included a testable hypothesis. Improving the quality of this section of the ITRS proposal would help ensure that this program contributes to strengthening the academic mission of the supporting university or institution.

Each proposal submitted should include the following information:

1.   A one-page summary describing the research in layman's language and assessing its technology transfer potential;

2.   An assessment of the supportive scientific and interdisciplinary expertise needed to enhance the potential success of the research, including joint activities with other researchers or research groups at the same or other institutions;

3.   A description of industrial participation representing true collaboration, including past, scheduled, and potential contacts and visits to and from industry, as well as scheduled or potential contributions of funds, equipment, and services by industry; and

4.   Identification of an existing industry that will utilize project results or of a new industry to be created through the proposed research.

To the Board of Regents: General Recommendations

Over the years there has been a substantial improvement in ITRS applicants obtaining industry and non-academic support as well as developing solid research plans. It is important to encourage these improvements through the following (5) processes:

1.   Continue to provide workshops and seminars for faculty on proposal preparation and requirements; development of consortia and cooperative research centers; patent and licensing procedures; and technology transfer to commerce.

2.   Ensure that funded projects obtain the required industrial matching support. Principal investigators should be required to document acquisition of the recommended level and types of industrial matching support by June 30, 2017, for the mandated first-year matching commitment; by March 31, 2018, for the required second-year match; and by March 31, 2019, for the required third-year matching commitment. The staff of the Board's Office of Sponsored Programs should further promote recognition around the State that the ITRS not only encourages but requires industrial and/or federal governmental support as a condition for funding. Significant external funding is often necessary to purchase equipment and to fund salaries.

3.   Notify applicants that literature reviews, the development of databases, and the drafting of research protocols should take place prior to submission of a proposal. These activities should not be funded by the ITRS.

4.   Notify applicants that the industrial support obtained should be incorporated into the budgets of proposals under the appropriate line items.

5.   Where appropriate, request applicants to include more detailed information regarding current and potential intellectual property rights related to their proposals.

APPENDIX A
ITRS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING
(PRIORITY ONE) (7)

Rank	Proposal No.	Institution	Recommended BORSF 1st Year Funds	Recommended BORSF 2nd Year Funds	Recommended BORSF 3rd Year Funds
1	027B	ULM	$ 75,000	$ 75,000	$ 75,000
1	003B	LSU-AG	40,950	39,950	0
1	021B	ULL	68,300	68,300	68,300
1	005B	LSU A&M	60,686	59,686	58,686
5	016B	TULANE	85,000	80,000	80,000
*6	010B	LSU A&M	59,773	56,885	54,885
7	017B	ULL	50,991	43,994	35,623
TOTAL			**$ 440,700**	**$ 423,815**	**$ 372,494**

*Note: Availability of funds for those proposals below the ***** is uncertain at this time. At a minimum, any remaining BoRSF first-year monies should provide partial funding for the next rank order proposal pending acceptance by the institution and Board approval.

APPENDIX B**
MERITORIOUS ITRS PROPOSALS RANKED PRIORITY ONE BY THE SUBJECT-AREA PANELS AND
CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING (2)

015B   025B

Note: ******The panel's comments on these proposals are provided in **Appendix C.3.** Subject-area panel reviews for each of these proposals will also be provided to the applicant in July 2017.

APPENDIX C
MERITORIOUS ITRS PROPOSALS OF LOWER PRIORITIES

PRIORITY TWO** (4)

006B   009B   011B   020B

Note: ******These proposals are not listed in rank order of merit and are not recommended for funding as submitted. The panel's comments on the proposals ranked Priority Two are provided in **Appendix C.4.** Subject-area panel reviews for each proposal will be provided to the applicant in July 2017.

PRIORITY THREE** (15)

001B	014B
002B	018B
004B	019B
007B	022B
008B	023B
012B	024B
013B	026B
028B	

Note: **These proposals are not listed in rank order of merit and are not recommended for funding as currently submitted. The final panel's general comments on the proposals ranked Priority Three are provided in **Appendix C.5.** Subject-area panel reviews for each proposal will be provided to the applicant in July 2017.

APPENDIX C.1

GENERAL EXTERNAL AND INSTITUTIONAL MATCHING
REQUIREMENT STIPULATIONS FOR ITRS AWARD RECIPIENTS

External (i.e., industrial or approved governmental) and institutional funding commitments may not be reduced below levels pledged in the original proposal unless reductions are specifically permitted in the funding stipulations for a grant. In some cases, additional external funding over and above that pledged in the proposal (see Appendix C.2) may be required. The types and amounts of additional required funding are specified in the funding stipulations for the affected awards. **Unless otherwise indicated, all awards are contingent upon receipt by the Board no later than June 30, 2017, of updated documentation from the provider(s) of the external match reconfirming provision of the match pledged in the proposal. Furthermore, second-year funding will be contingent upon receipt by the Board no later than March 31, 2018, of <u>updated</u> documentation from the provider(s) of the external match reconfirming provision of the required second-year external match. Third-year funding will be contingent upon receipt by the Board no later than March 31, 2019, of <u>updated</u> documentation from the provider(s) of the external match reconfirming provision of the required third-year external match. Letters (originals) from the private-sector partner or government agency providing the required match must be furnished to the Board <u>on company or agency letterhead</u> and signed by <u>authorized representatives of the companies or agencies</u> by these same dates.**

Although budget requests from the Board of Regents Support Fund have been reduced significantly in some cases, no budget has been reduced to a degree that would impair execution of the proposed research and accomplishment of the project goals. **<u>Therefore, funding for each recommended Priority One project is made contingent upon full and complete execution of the work plan delineated in the proposal.</u>**

APPENDIX C.2
COMMENTS AND FUNDING STIPULATIONS FOR
PROPOSALS HIGHLY RECOMMENDED FOR FUNDING
(PRIORITY ONE)

Proposal 027B   **Rank: 1**

TITLE:	*Novel Extra-Virgin Olive Oil-Based Functional Food for Cancer and Alzheimer's Disease Prevention*
INSTITUTION:	University of Louisiana at Monroe
PRINCIPAL INVESTIGATOR:	Khalid El Sayed, Ph.D.

COMMENTS: The Mediterranean diet correlates with lower incidences of cancer and age-related cognitive disease. Computer-assisted and other studies identified several natural phenolic secoiridoids from extra-virgin olive oil (EVOO) as potentially useful for metastatic malignancies and the risk of Alzheimer's disease (AD). Recent studies by the PI's group showed that EVOO-derived (-)-oleocanthal selectively suppressed several human breast cancer cell lines without affecting normal human mammary epithelial cell growth through its c-Met inhibitory effects. These results were further supported by multiple *in vivo* mouse models. In addition to its cancer preventive and control activity, oleocanthal has demonstrated an anti-AD activity as the PI's group has shown its ability to enhance the clearance of the AD neurodegenerative hallmark amyloid-beta (Aβ) from the brain via up-regulation of Aβ transport proteins in *in vitro* and *in vivo* models. These findings provide evidence for the potential of oleocanthal to reduce the risk of AD.

The proposed research represents collaboration between the University of Louisiana at Monroe (ULM) and Segue Therapeutics (STX), LLC, a Shreveport-based parent company founded by Dr. James Cardelli, a retired 30-year LSUHSC-Shreveport faculty member. The objective of the proposed research is to develop a cost-effective oleocanthal-rich EVOO-based functional food product and test its stability, health benefits and different bioavailability models. Oleocanthal is a phenylethanoid, natural phenolic compound which gives olive oil its "bite". The panel noted that although there is nothing new about its alleged health benefits and anti-cancer activities, the three investigators form an excellent research group with evidence of productivity in the field. The biological anti-tumor and anti-inflammatory effects of oleocanthal are strongly supported by prior work from the researchers as well as others. The studies of AD in transgenic mice are of particular interest. Although questions still remain concerning the economic utility of an oleocanthal-based nutraceutical, the science behind this work is well worth pursuing. Dr. El Sayed has an extensive and distinguished publication record as do Dr(s) Kaddoumi and Cardelli. Segue Therapeutics pledged cash support in the amount of $7,500/year. The proposed budget, albeit relatively high, appears appropriate considering that animal experiments tend to be costly. This is a very interesting proposal that could potentially convince nutraceutical skeptics. The PI noted that IACUC approval is pending, however university approval must be received prior to funding. Funding is recommended at the level requested for each year of the project, i.e., $75,000 for year one, $75,000 for year two, and $75,000 for year three. The PI is required to maintain support for two graduate research assistants (GRAs) at the level proposed in the original budget for each year of the project.

As a condition of funding, the types and amounts of the institutional and external matching commitments stated in the proposal should be maintained <u>in full</u>. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$75,000	$7,500 as specified in the proposal
2nd Year	$75,000	$7,500 as specified in the proposal
3rd Year	$75,000	$7,500 as specified in the proposal

Appendix C.2 (continued)

Proposal 003B **Rank: 1**

TITLE: *Sustainable Fiber-Polymer Composite In-Fill Materials for Artificial Turf: Industrial Application*

INSTITUTION: Louisiana State University - Agricultural Center

PRINCIPAL INVESTIGATOR: Qinglin Wu, Ph.D.

COMMENTS: Artificial turf is a synthetic, grass-like cover that mimics natural grass in appearance and function. It may be used indoors and outdoors. When used on athletic fields, it provides a consistent year-round, all-weather playing surface built to withstand extended use without downtime for recovery of vegetation. As a landscape cover, artificial turf provides a low-maintenance, weed-free surface that does not need to be watered or fertilized. Most artificial turf systems include a multi-layered backing system, resilient "grass" blades, and granular filler that is spread on the surface of the backing system up to a certain depth of the "grass" blades to resemble natural turf. Outdoor artificial turfs also typically include a drainage layer. Many different granular in-fill materials have been used. The in-fill materials, if formulated and used correctly, keep grass upright and provide the needed shock absorbency and deformability. Some of the current in-fills include crumb rubber derived from scrap tires, Ethylene Propylene Diene Monomer (EPDM), organic fibers, pure and coated silica sand, and thermoplastic elastomer (TPE). There are economic, environmental, ecological, health and safety concerns with using some of the current in-fill components.

The proposed research represents a public-private partnership between LSU-Agricultural Center, Pro-Log, Inc. (New Iberia, LA) and Wallace Molding and Millwork, Co. (Columbia, LA). The research is directed towards the use of green composite formulations that lack waste rubber-related environmental and health issues to serve as in-fill material for artificial turf application. The current technology provides economic polymer cellulosic fiber granules comprising a thermoplastic matrix, cellulosic fibers, and optional blending agents such as coupling agents, biocides and colorants. The PI provided an excellent work plan supported by a very comprehensive literature review that represents a new direction of potential commercialization. Dr. Wu has an outstanding history of grant support, including publications, patents, and commercialization. The PI and industry partners Pro-Log and Wallace Molding have collaborated in the past to develop and market "Tiger Bullets", a composite lost circulation control material for oil-field application and an additive for cementing operations. Pro-Log and Wallace Molding & Millwork pledged support valued at $10,000/year ($5,000 cash and $5,000 in-kind) each*.* It should be noted that the industry partners are looking for an alternative business venture. Motz Co. (Cincinnati, OH), although not listed as an industry partner, has signed a non-disclosure agreement with LSU-Ag for exchanging test in-fill samples and research data on the technology. The PI is encouraged to seek Motz Co. as a potential partner for future support. The test plan, although sound and well stated, never directly addressed the cost associated with the technology—hence the economic justification should be clarified. It is recommended that the proposed budget be revised to eliminate support for the Research Associate (RA), resulting in a year one budget of $40,950. A budget of $39,950 is recommended for year two. The PI is required to maintain support for the GRA at the level proposed in the original budget.

As a condition of funding, the types and amounts of the institutional and external matching commitments stated in the proposal should be maintained in full. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$40,950	$20,000 as specified in the proposal
2nd Year	$39,950	$20,000 as specified in the proposal

Appendix C.2 (continued)

Proposal 021B   **Rank: 1**

TITLE: *Characterization of Complex Fracture Propagation in Naturally Fractured*
                                        Formations Using Digital Image Correlation (DIC) Technique and Simulation

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Mehdi Mokhtari, Ph.D.

COMMENTS: Louisiana has vast amounts of unconventional resources such as the Haynesville and Tuscaloosa shale plays. More accurate prediction of hydraulic fracture geometry is required not only for the optimization of hydraulic fracturing operations to get higher economic benefits but also for improved environmental protection and social license to run fracturing operations. The incorporation of heterogeneity in terms of natural fractures and laminations is critical to enhance the prediction of fracture geometry.

The proposed research represents collaboration between the University Louisiana at Lafayette (ULL), Statoil Gulf Services, LCC (Houston, TX), Metarock Laboratories, Inc. (Houston, TX) and Schlumberger, Inc. (Houston, TX). The specific objective of the research is to determine the role of natural fractures and laminations on fracture propagation using indirect tensile stress conditions while the strain developed in the sample is measured using a high-speed camera (Digital Image Correlations) technique. The experiments will be simulated at the laboratory scale with finite element methods and the results incorporated to reservoir-scale simulations of hydraulic fracturing in unconventional reservoirs. The experiments will be conducted on laminated sandstone samples, preserved shale and limestone samples with lamination and natural fractures in dry and saturated conditions. Prior research has shown very good preliminary results; however, considerable work will be needed for real-world shale field application. Fracture predictions in porous media are difficult at best and any improvements would be of significance. The research is straightforward and represents a good connection to Louisiana's economic stability. Partnering with Schlumberger, a world-leading oil and gas service provider, is evidence of the importance of the research. Industry partner Statoil, LLC has agreed to provide 50 feet of preserved core samples. The core samples will be returned to Statoil at the end of the ITRS project. Metarock Laboratories, Inc., pledges support valued at $150,000 which consists of professional services, laboratory testing, and student/faculty training support via the Links with Industry and National Labs (LINK) program through Louisiana EPSCoR. Schlumberger will provide project support through the donation of the Mangrove software valued at $162,123 in addition to student training based on the commercial 5-day public training class valued at $27,000. The panel view provisions for student training in both the Mangrove software system at Schlumberger's headquarters and laboratory testing at Metarock as an excellent component to this work. The panel noted a discrepancy in the total amount of pledged industrial support ($162,123) as stated in the Schlumberger letter of October 10, 2016, rather than $159,250. Therefore, Schlumberger must provide a revised/updated letter support that correctly reflects the total amount of pledged support. Funding is recommended at the level requested for year one of the project i.e., $68,300. Similar budgets of $68,300 are recommended for year two and year three. The PI is required to maintain support for graduate research assistants (GRAs) and undergraduate students at the level proposed in the original budget for each year of the project. The PI should note that Support Fund money requested for successive years of a research project should not increase.

As a condition of funding, the types and amounts of the institutional and external matching commitments stated in the proposal should be maintained <u>in full</u>. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$68,300	$93,083 as specified in the proposal
2nd Year	$68,300	$103,083 as specified in the proposal
3rd Year	$68,300	$113,083 as specified in the proposal

Appendix C.2 (continued)

Proposal 005B   **Rank: 1**

TITLE: *Performance Enhancement of Recycled Concrete Waste for Civil Applications*

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Steve C.S. Cai, Ph.D.

COMMENTS: Recycling demolished industrial waste such as concrete aggregates is a very efficient solution to mitigate environmental deterioration issues we are facing today. The main difference between the natural aggregates and recycled concrete aggregates is that the latter always contain attached cement mortar and contaminates which results in weak interfacial zones between the aggregates and cement for the recycled concrete. This weak interface and the deteriorated quality of recycled aggregates will cause certain strength losses. The strength losses in recycled aggregated concrete can be compensated for by adding minerals and/or by improving the production procedure. These techniques are expensive and time consuming, which discourages private companies to promote the concrete recycling technology.

The proposed research represents collaboration between Louisiana State University and A&M College and Advanced Cement Technologies (ACT), (Blaine, WA). The objective of the proposed research is to explore the feasibility of developing a geopolymer material-based "GeoCement" that will replace the Portland cement. Geopolymer, a type of synthesized inorganic "green" material is economical, durable, and provides excellent bonding capacity for the proposed applications. The developed products will make the recycling of concrete profitable for related industries but also promote sustainable development of communities. The amount of concrete waste available nationwide is massive and a potential process for reuse is considered very important. This is a well-written proposal submitted by a highly qualified PI. To explore the concept and feasibility of the proposed study, preliminary monotonic and cyclic loading tests have been carried out in the PI's laboratory. The results from the preliminary investigations are very promising. The cracking strain of the proposed material is very low (0.01%), but concrete has a fracture strain of (0.002%) so there is a marked improvement. The scanning electron microscopy (SEM) plan for microstructure crack observation is not well developed, i.e., details on where to look and how to prepare specimens were not provided and should be addressed. The work is reasonably but long-term properties of the product are open to question. ACT pledges technical support and materials valued at $15,000 per year. Changsha University of Science and Technology (CSUST) has pledged its full support of Dr. Cai's collaborative research in both laboratory and field implementation. Funding is recommended at the level requested for each year of the project, i.e., $60,686 for year one, $59,686 for year two, and $58,686 for year three. The PI is required to maintain support for graduate research assistants (GRAs) and undergraduate students at the level proposed in the original budget for each year of the project.

As a condition of funding, the types and amounts of the institutional and external matching commitments stated in the proposal should be maintained <u>in full</u>. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$60,686	$15,000 as specified in the proposal
2nd Year	$59,686	$15,000 as specified in the proposal
3rd Year	$58,686	$15,000 as specified in the proposal

Appendix C.2 (continued)

Proposal: 016B   **Rank: 5**

TITLE: *Novel Photonic Processing of Transition Metal Oxides*

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Douglas Chrisey, Ph.D.

COMMENTS: Bulk oxides are often considered as synonymous with ceramics; however, oxides with transition metals that straddle the subtle boundary between covalent, ionic and metallic bonding demonstrate numerous important physical and chemical phenomena, ranging from high-T_c superconductivity in layered cuprates, colossal magnetoresistance in perovskite manganites, to the coexistence of magnetism and ferroelectricity (multi-ferroicity). The PI will demonstrate the potential of rapid photonic processing to tune the properties at the nanoscale for transition metal oxide thin films using the Novacentrix PulseForge. The PulseForge will allow the PI's research team to tap into the potential of the novel properties of these materials for future application and IP protection by tuning their nanometric microstructure. To realize these goals, the PI will concentrate on the approach of instantaneous photonic synthesis to achieve the low-cost and large-scale preparation of 3-D nanostructured TiO_2 and other transition metal oxide thin films by combining chemical solution deposition with pulsed light irradiation. The absorbed pulsed photons activate the photosensitive Ti-organic precursor films to perform a pulsed photodecomposition, resulting in 3-D nanostructure crystalline TiO_2 thin films with a dendritic top layer and a dense bottom layer. Subsequent pulsed light irradiation rapidly improves the crystalline quality of TiO_2 thin films and leads to the *in-situ* formation of reduced graphene/graphite oxides layers covering TiO_2 nanograins through the pulsed photothermal effect.

The proposed research is a collaborative effort between Tulane University and NovaCentrix (Austin, TX). The specific aims of the research are: (1) to optimize the instantaneous manufacturing of TiO_2 thin films; (2) to fabricate other transition metal oxides important for energy and environmental applications; and (3) to develop a preliminary model for the pulsed photonic processing of oxide precursors. The technology developed would be suited for high throughput roll to roll (web or reel based) processing of metal oxides on substrate. The panel viewed specific aim (3) as the component with the most potential for economic development. It is unfortunate that some of the goals in this proposal were not combined with those in ITRS proposal 015B, "High Performance Anodes for Lithium Ion Batteries". The information in ITRS proposal 015B is synergistic in supporting the potential economic benefits of this research. Although the economic impact on the State of Louisiana was not clearly stated, it is foreseeable in the future. The members of the research team have solid academic records and are well-qualified to carry out the proposed work. Industry partner NovaCentrix pledged technical and financial support in the amount of $25,000 over the 3-year period in addition to upgrading the currently installed PulseForge 1300 at the Tulane laboratory at a heavily discounted price. The panel viewed this as an extremely expensive project that lacked detailed information in its budget justification. For this reason, the Support Fund and Institutional Match budget/justification must be revised to provide clarity prior to funding. It is recommended that the proposed budget be reduced to limit travel support to $2,000, supplies to $15,000, rentals to $10,000, and other expenses to $5,000. A budget of $85,000 is recommended for year one. Budgets of $80,000 are recommended for year two and year three. The PI is required to maintain support for graduate research assistants (GRAs) at the level proposed in the original budget for each year of the project.

As a condition of funding, the types and amounts of the institutional and external matching commitments as stated in the proposal should be maintained <u>in full</u>. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$85,000	$10,000 as specified in the proposal
2nd Year	$80,000	$7,500 as specified in the proposal
3rd Year	$80,000	$7,500 as specified in the proposal

Appendix C.2 (continued)

Proposal 010B   **Rank: 6**

TITLE: *Development of an Integrated Framework for Managing Sole Source Aquifer,*
                                    Southeastern Louisiana

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Frank Tsai, Ph.D.

COMMENTS: Groundwater resources are vital to Louisiana's socio-economic development and expansion. Despite being surrounded by abundant surface water, Louisiana relies on high-quality, low-cost groundwater to sustain its economic development. Especially during droughts, groundwater is an important source to combat water shortages. Groundwater serves more than a half-million Louisiana residents via privately owned individual wells, with 1,377 community water systems using groundwater for nearly three million people, over half of Louisiana's population. The goal of the project is to develop an integrated framework that couples surface water, groundwater, and geologic systems to address future groundwater sustainability, resilience and land subsidence, which impacts diversified private and public stakeholders in the region.

The proposed research represents collaboration between Louisiana State University and A&M College and the Capital Area Ground Water Conservation District (CAGWCD). The project involves all industrial users including privately owned water utility companies in the CAGWCD. Water is a critical resource and hence gives a high relevance to work aimed at understanding a multi-pronged systemic model. Clean and adequate sources of water are essential for any community's economic and biological survival. This is a well-written proposal with achievable goals, albeit large in scope. There are many water quality centers in the United States and much work has already been accomplished. The CAGWCC pledged cash support of $20,000 per year. The panel noted that Dr. Tsai is currently funded by another ITRS project entitled "Conjunctive Management of Baton Rouge Multi-Aquifer System for Saltwater Intrusion." The PI is therefore encouraged to leverage existing resources and strengthen the applicability of industrial transfer. Funding is recommended at the level requested for each year of the project i.e., $59,773 for year one, $56,885 for year two, and $54,885 for year three. The PI is required to maintain support for two graduate research assistants (GRAs) at the level proposed in the original budget for each year of the project.

As a condition of funding, the types and amounts of the institutional and external matching commitments as stated in the proposal should be maintained in full. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$59,773	$20,000 as specified in the proposal
2nd Year	$56,885	$20,000 as specified in the proposal
3rd Year	$54,885	$20,000 as specified in the proposal

Appendix C.2 (continued)

Proposal 017B   **Rank: 7**

TITLE: *Secure Information Sharing for Proactive Detection of Criminal Activities*

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Mohsen Amini Salehi, Ph.D.

COMMENTS: Law Enforcement Network Sharing Solution (LENSS) is a cloud-based software system developed by Perceptive Intelligence. The system enables law enforcement officers to collect and share their daily observations of criminal activities in a digital form. The observations and the obtained background information of a particular subject are shared with other officers upon their request. To extend LENSS for proactive investigations, it needs to connect and search datasets from multiple organizations beyond the LENSS internal dataset. In particular, LENSS users need to perform semantic search queries over the datasets and retrieve results ranked based on their relevance to the search query. The increasing volume and diversity of the datasets from multiple organizations make the semantic search a big data-scale problem. In addition, organizations generally cannot share their whole datasets due to privacy constraints of their data, specifically when the search operation is performed in potentially untrusted cloud environments. To address these challenges, the PI proposes the development of an architecture to enable real-time and secure semantic search that operates on encrypted data sets in the cloud.

The proposed research represents a collaboration between the University of Louisiana at Lafayette (ULL) and Perceptive Intelligence, LLC, a Louisiana company. The overall goal of the research is to provide a secure semantic search for big data-scale multi-source datasets using cloud environments. Although the panel views this research as having lofty goals with a modest budget, the potential outcomes could have wide-spread use in local law enforcement. The PI is a relatively new faculty member at ULL with a good publication record and a very modest history of grant support. The co-PI, Dr. Gottumukkalla (Director of Research, Informatics Research Institute and Site Director, Center for Visual and Decision Informatics), on the other hand, has an excellent history of grant support including 2 US patents. Perceptive Intelligence, LLC (no mailing address on the company letterhead) pledges support of $40,500 cash and $81,875 in-kind over the 3-year period. Prior to funding, a revised letter of support from Perceptive Intelligence, LLC must be provided with the company's complete contact information including a physical mailing address. Funding is recommended at the level requested for each year of the project i.e., $50,991 for year one, $43,994 for year two, and $35,623 for year three. The PI is required to maintain support for graduate research assistants (GRAs) and undergraduate students at the level proposed in the original budget for each year of the project.

As a condition of funding, the types and amounts of the institutional and external matching commitments as stated in the proposal should be maintained <u>in full</u>. Funding is contingent upon receipt by the Board no later than June 30, 2017 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.

BUDGET	BoRSF	EXTERNAL
1st Year	$50,991	$74,125 as specified in the proposal
2nd Year	$43,994	$24,125 as specified in the proposal
2nd Year	$35,623	$24,125 as specified in the proposal

APPENDIX C.3
COMMENTS ON PROPOSALS RANKED PRIORITY I BY THE
SUBJECT-AREA PANEL AND CONSIDERED BY THE FINAL PANEL
BUT NOT RECOMMENDED FOR FUNDING

Proposal 015B

TITLE: *High Performance Anodes for Lithium Ion Batteries*

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Douglas Chrisey, Ph.D.

COMMENTS: Lithium-ion energy storage is one of the fastest growing industries globally. The use of silicon nanoparticles (SiNPs) as an active material is now becoming a standard. However, the lack of access, cost, and the poor cyclability of Si-based anodes are causing major drawbacks—slowing industry adoption. In addition to the inherently high specific lithium storage capacity of Si (>4200 mAh/g), its use in a reduced graphene oxide (rGO) matrix has been proposed as a way to mitigate the currently existing volume change upon lithiation/delithiation that ultimately leads to Si lattice rupture and anode failure due to an unstable solid-electrolyte interphase (SEI) layer. The final goal is to fabricate Si@rGO electrodes that are far superior to existing anode materials, but readily conducive to rapid commercial manufacturing.

The proposed research represents a good balance between advanced technology and commercialization. The specific aims of the research are: (1) manufacturing SiNPs embedded in reduced graphene oxide matrix via PulseForge photonic processing; (2) fabricating Si@rGO anodes with different Si weight loading; and (3) optimizing the electrical conductivity of Si@rGO anodes by carbonizing various types of organic surface functionalization. PulseForge photonic sintering is a high-power annealing technique that offers a significant degree of control over the exposure energy, intensity, and light pulse shape to achieve high reaction and sintering rates. The PI's research team has adapted the PulseForge for the sintering of polymers, inorganic-polymer composites and nanophase oxide thin films. The ball milling of Si nanoparticles appears very economically advantageous; however, the proposal demonstrated only a slight economic impact on the State of Louisiana. This is an extremely expensive project that lacked sufficient detailed information and justification relative to the proposed budget. One of the reviewers stated that if ITRS proposals 015B-17 and 016B-17 had been combined it would have been an excellent proposal. Industry partner Advanced Nanopartical Manufacturing (ADVANO) pledged support in the form of salary and fringe benefits for the co-PI in the amount of $10,000 per year.

Appendix C.3 (continued)

Proposal 025B

TITLE: *Removal of Metals from Oil and Gas Industries' Wastewater*

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Ramalingam Subramaniam, Ph.D.

COMMENTS: Water pollution and the treatment of polluted water are challenges of great importance and interest for society worldwide. Due to the presence of high dissolved solids content and various other constituents found in production water from the fracking industries, disposal is becoming very difficult and costly. It also causes major land disturbance, air and noise pollution, contamination of surface water and groundwater, and habitat fragmentation, as well as other ecological impacts. The continued usage of fresh water increases the threat of water scarcity. The goal of the proposed research is to develop novel, cost-effective adsorption technology from pecan shells to remove toxic metals, such as iron, barium, and strontium from production water to treat and recycle.

This an interesting proposal that holds some scientific merit, yet there are questions still to be answered. It is the panel's opinion that one would need a large amount of pecan shells for this adsorption technology and it is unclear if the shells can be easily collected from scattered pecan farmers. The PI did not include much-needed information relative to the energy costs associated with shell carbonization and activation, contaminants and CO_2 produced by the process. Moreover, it appears that the work consists of moving toxic material from polluted water to the solid phase. The proposal did not answer a very important question—what is now done with highly toxic carbonized and activated pecan shells? Without addressing this major problem, the project will not likely have an impact on Louisiana's economy. There may be some utility of the technology for small-scale solid-phase capture but it does not seem practical for applications in the area of fracking. The PI does not appear to have current research funding. This is somewhat unclear when reviewing the "Current and Pending Support" section of the proposal.

APPENDIX C.4
GENERAL STATEMENT ON MERITORIOUS PROPOSALS
NOT RECOMMENDED FOR FUNDING AT THIS TIME
(PRIORITY TWO)

Proposals included in this category are those applications the panel believes to be meritorious, although of a lower order than those rated Priority One. Individual subject-area commentaries on proposals ranked Priority Two are not included in this report. Proposals so ranked were not recommended for funding.

Proposal 006B

TITLE: *Modelling of Wellbore Stability Problems and Simulation Tool Development*

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Shengli Chen, Ph.D.

COMMENTS: The mechanical behavior of shales plays a predominant role in controlling wellbore stability. It is extremely complex and usually can only be reasonably described by the elastoplasticity theory. The primary goals of the proposed project are (1) to conduct thorough research on wellbore stability in a realistic way by incorporating the sophisticated and very important elastoplastic mechanical behavior of shale formations; and (2) to seek significant improvement in the drilling stability analysis and design in shales through a wellbore simulator development, thus optimizing oil exploitation and production in Louisiana and the US.

This proposal would benefit from careful editing and proofreading. Much of the proposal appears to be a literature review rather than a research proposal. It should be noted that Dr. Chen is the PI of an ITRS grant entitled *"A Simulation Tool for Hydraulic Fracturing Modelling in Porous Rock Formations"* in the amount of $171,834 for the period 6/2016 through 6/2019. The proposed work is fairly well developed but should provide more information about the calibration procedures' benefit and the improvement in the models, e.g., will the improvement increase precision by 2-5-10 fold? Industry partner Rapiere Resources Company pledges support valued at $30,000 per year. The PI requested support for two graduate students; however, the project does not appear to require this level of student participation.

Appendix C.4 (continued)

Proposal 009B

TITLE: *Use of Lower Body Exoskeletons to Reduce Physical Demands in Industrial Workers*

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Jan Hondzinski, Ph.D.

COMMENTS: Activities such as manual materials handling, squatting, kneeling, and climbing stairs are common in many industrial jobs. Excessive force, awkward postures, and repetitive movements associated with these activities can cause injuries to the back and lower extremities which account for a significant percentage of work-related musculoskeletal disorders (WMSD). Despite this, effective interventions are sparse. An interesting solution is to exploit assistive robotic devices such as exoskeletons attached to the human body for the purpose of delivering mechanical power to augment user strength, endurance and/or mobility. The purpose of this project is to determine if lower-body exoskeletons can reduce physical demands during performance of common tasks used in industry without altering movement kinematics that may place users at increased risk for WMSD.

This is an active area of research, especially among European academics. The idea of using exoskeletons to assist workers is important to heavy manufacturing industries and driven by the insurance industry. Much work has been done with "co-bots" that interact with the human body but do not necessarily change their structure. The PI is well versed and published in the soft side of this work but provided little evidence that any type of experimental procedures could be successful. The PI is an ergonomist. Dr. Marcio de Queiroz, co-PI for the project, is a Professor of Mechanical Engineering and serves as Coordinator for the Robotics Engineering Minor at LSU. The proposed budget appears heavy in research salary. Industry partner, B-temia Human Augmentation (Quebec, Canada) pledged support valued at $72,000 that represents a 35% reduction for the leasing of K-SRD Dermoskeleton over a 3-year period—the active lower limb device initially developed for military applications—for use in the proposed study. It is the panel's position that since B-temia will be the beneficiary of the work, its level of contribution is not seen as appropriate and therefore an overriding negative. Additionally, though B-temia has signed a cooperative agreement with LSU, the panel sees the connection to LSU and ultimately the State of Louisiana as weak at best. Industry partner Lemoine Company, a general contractor based in Louisiana, has agreed to allow several employees to test the exoskeleton in the laboratory, provide feedback and help evaluate its performance in common construction tasks.

Appendix C.4 (continued)

Proposal 011B

TITLE: *CO$_2$ Geological Storage Capacity and Containment in South Louisiana*

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Mehdi Zeidouni, Ph.D.

COMMENTS: CO$_2$ Geological Sequestration (GCS) is a method to cut atmospheric CO$_2$ emissions as a means to mitigate climate change. GCS is especially important for Louisiana, which is required to reduce its CO$_2$ emissions by 40% by 2030. Two main challenges to address the feasibility of GCS in Louisiana are the CO$_2$ storage capacity and its containment. It is required to identify and determine the capacity of target storage formations. In addition, the public should be assured that GCS can be done safely through efficient use of subsurface Monitoring, Verification, and Accounting (MVA) technologies to enable tracking of the injected CO$_2$ and determination of its containment.

The PI proposes to (1) estimate the CO$_2$ storage capacity in a depleted oil reservoir and an attached saline aquifer in Louisiana, and (2) apply MVA technology using pressure and temperature signals to evaluate storage safety by evaluating the integrity of old abandoned wells which are identified as main potential leakage pathways for the injected CO$_2$. It is the panel's opinion that there seems to be little rationale for spending the time to monitor well integrity for a project whose purpose is unlikely feasible. The weakest portion of the project is capacity estimation and how portable the simulation will be across a wide variety of applications. The PI provided no information relative to the cost of collecting and compressing the CO$_2$, with questions still remaining, e.g., are there sufficient localized sources to make this worthwhile? The proposed budget appears inappropriate, including considerable cost for consultant support which the panel believes should be provided by the industrial partner.

Proposal 020B

TITLE: *Co-Optimization of a Fuel-Flexible Micro Gas Turbine and Fuels for Green Power*

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Lulin Jiang, Ph.D.

COMMENTS: Biofuels are desirable, renewable energy sources because of the closed-carbon cycle and lower or zero greenhouse gas (GHG) effect. Clean and efficient liquid fuel combustion strongly relies on spray fineness. Viscous source oils such as vegetable oil (VO) are converted into biodiesel with low viscosity that can be adapted into existing fuel injection systems, lowering economic viability of biofuels and generating abundant viscous byproduct—glycerol.

The overall goal of the proposed research is to tackle the economic and technical barriers of biofuel utilization, provide powerful injection systems and thus enable fuel-flexible combustion systems with ease of transition among fossil fuels and viscous bio-oils for clean power. The proposal seeks to enhance injector delivery for a high viscosity fuel such as vegetable-based oil. The question of the need for such an injector should be addressed immediately in an economic argument—which was not provided. Atomization imaging has been around for approximately 25 years and many techniques have been well established in the research literature—this is not novel. No soot formation is described and the probability of injector fouling was not discussed. Although the research team is appropriate, members' specific roles were not well developed. The proposed work could be a success, but for what gain? The investigators should consider rewriting the proposal and seeking stronger industrial support.

APPENDIX C.5
GENERAL STATEMENT ON PROPOSALS RANKED
PRIORITY THREE BY THE FINAL PANEL

Individual commentaries on proposals ranked Priority Three by the final panel are not included in this report. Proposals so ranked were not recommended for funding for at least two of the following reasons (not listed in order of importance):

- Insufficient or inappropriate industrial matching funds were pledged and/or external support documented in the proposal budget was not substantiated by required letters of industrial support

- The industrial partner'(s) role in the research collaboration was not provided and/or detailed in the proposal

- The proposal did not have clear objectives and/or research plans lacked scientific rigor or completeness

- The background of the principal investigator was inconsistent with the proposed research and/or the principal investigator had an unusually poor publication record in the proposed area of research

- The proposal showed little or no potential for contributing to the near-term development and diversification of Louisiana's economy

- The proposal did not contain evidence of future commercialization, or it was not clear what economic benefit would be gained from the research

- Budgets were excessive, inadequately justified, or inconsistent with provided budget justifications

- The need for consultants and/or subcontracts was not adequately justified

- Equipment requests were excessive and/or inappropriate for the research proposed

APPENDIX D
LIST OF SUBJECT-AREA REVIEWERS WHO PARTICIPATED
IN PHASES I & II OF THE REVIEW PROCESS

Life Sciences and Bioengineering I

Dr. Brian Scott Baldwin, Chair
Department of Plant and Soil Sciences
Mississippi State University

Dr. Sangamesh Angadi
Department of Plant and Environmental Sciences
New Mexico State University

Life Sciences and Bioengineering II

Dr. Radu Marches, Chair
The Jackson Institute for Genomic Medicine

Dr. Leo Herbette
President, Exploria

Clean Technology and Energy

Dr. Russell D. Ostermann, Chair
Department of Chemical & Petroleum Engineering
University of Kansas

Dr. Roger A. Korus
Department of Chemical Engineering
University of Idaho

Digital Media and Enterprise Software

Dr. John Usher, Chair
Department of Industrial Engineering
Mississippi State University

Dr. Behrooz A. Shirazi
School of Electrical & Computer Science
Washington State University

Appendix D (continued)

Advanced Materials and Manufacturing

Dr. Mathew Schaefer, Chair
Department of Mechanical and Industrial Engineering
Milwaukee School of Engineering

Dr. Matthew J. Traum
Chief Executive Officer
Engineer Inc.
Department of Mechanical & Manufacturing Engineering Department
Tennessee State University

Coastal and Water Management

Dr. Trevor H. Boyer, Chair
Department of Environmental Engineering Sciences
University of Florida

Dr. James T. Anderson
Environmental Research Center
West Virginia University

APPENDIX E

SUMMARY OF PROPOSALS SUBMITTED TO THE
INDUSTRIAL TIES RESEARCH SUBPROGRAM (ITRS)
FY 2016-17

Proposal #	PI Name	Category	Institution	Project Title	Amount Requested			
					Year 1	Year 2	Year 3	Total
001B-17	Prof. Kenneth Bondioli	Life Sciences and Bioengineering	Louisiana State University Agricultural Center	Ligand-targeted germline editing for sex selection and improved agronomic performance	$113,875.00	$88,875.00	$83,875.00	$286,625.00
002B-17	Dr. Joan King	Life Sciences and Bioengineering	Louisiana State University Agricultural Center	High Value Products from Microalgal Biomass	$110,500.00	$99,766.00	$99,995.00	$310,261.00
003B-17	Prof. Qinglin Wu	Advanced Materials and Manufacturing	Louisiana State University Agricultural Center	Sustainable Fiber-Polymer Composite In-fill Materials for Artificial Turf: Industrial Application	$92,050.00	$91,050.00	$0.00	$183,100.00
004B-17	Prof. Michele Barbato	Advanced Materials and Manufacturing	Louisiana State University and A & M College	Use of sugarcane bagasse to reduce cost and carbon footprint of concrete materials	$131,296.00	$97,786.00	$97,554.00	$326,636.00
005B-17	Prof. Steve C.S. Cai	Clean Technology and Energy	Louisiana State University and A & M College	Performance enhancement of recycled concrete waste for civil applications	$60,686.00	$59,686.00	$58,686.00	$179,058.00
006B-17	Dr. Shengli Chen	Clean Technology and Energy	Louisiana State University and A & M College	Modelling of Wellbore Stability Problems and Simulation Tool Development	$71,000.00	$70,500.00	$58,750.00	$200,250.00
007B-17	Dr. Yuanhang Chen	Clean Technology and Energy	Louisiana State University and A & M College	Subsurface Zonal Thermal Management with Localized Filter Cake Control	$62,000.00	$47,500.00	$0.00	$109,500.00
008B-17	Prof. Jin-Woo Choi	Clean Technology and Energy	Louisiana State University and A & M College	Portable Lipid Content Sensing in Biomass	$95,625.00	$92,024.00	$91,964.00	$279,613.00
009B-17	Dr. Jan Hondzinski	Life Sciences and Bioengineering	Louisiana State University and A & M College	Use of Lower Body Exoskeletons to Reduce Physical Demands in Industrial Workers	$104,650.00	$93,554.00	$88,104.00	$286,308.00
010B-17	Prof. Frank Tsai	Coastal and Water Management	Louisiana State University and A & M College	Development of an Integrated Framework for Managing Sole Source Aquifer, Southeastern Louisiana	$59,773.00	$56,885.00	$54,885.00	$171,543.00
011B-17	Dr. Mehdi Zeidouni	Clean Technology and Energy	Louisiana State University and A & M College	CO2 Geological Storage Capacity and Containment in South Louisiana	$130,138.00	$55,338.00	$0.00	$185,476.00
012B-17	Dr. shaurav alam	Other - Construction and Transportation Engineering	Louisiana Tech University	Light Weight Concrete Mix Design (LWCMD) for Louisiana's Transportation and Construction Industry	$56,978.00	$57,053.00	$41,874.00	$155,905.00
013B-17	Dr. Dennis O'Neal	Life Sciences and Bioengineering	Louisiana Tech University	SmartShoe integrating sensors and a smartphone for mitigation of diabetic foot ulcers	$69,791.00	$69,303.00	$70,355.00	$209,449.00
014B-17	Dr. Jacob Borden	Clean Technology and Energy	McNeese State University	Comprehensive Analysis and Debottlenecking of Ethane Cracker Quench Columns	$70,581.00	$70,581.00	$0.00	$141,162.00
015B-17	Prof. Douglas Chrisey	Advanced Materials and Manufacturing	Tulane University	High Performance Anodes for Lithium Ion Batteries	$133,527.00	$89,523.00	$87,953.00	$311,003.00
016B-17	Prof. Douglas Chrisey	Advanced Materials and Manufacturing	Tulane University	Novel Photonic Processing of Transition Metal Oxides	$133,127.00	$83,346.00	$82,603.00	$299,076.00
017B-17	Dr. Mohsen Amini Salehi	Digital Media and Enterprise Software	University of Louisiana at Lafayette	Secure Information Sharing for Proactive Detection of Criminal Activities	$50,991.00	$43,994.00	$35,623.00	$130,608.00
018B-17	Dr. Daniel Gang	Coastal and Water Management	University of Louisiana at Lafayette	Laboratory Evaluation and Design Optimization of the Pile Supported Wave Screen System [PSWSS], a Highly Effective System for Shoreline Protection	$69,053.00	$69,451.00	$69,122.00	$207,626.00
019B-17	Prof. Boyun Guo	Clean Technology and Energy	University of Louisiana at Lafayette	Development of High-Efficiency Software Engines for the Clean Energy Industry	$144,422.00	$99,812.00	$99,865.00	$344,099.00
020B-17	Dr. Lulin Jiang	Clean Technology and Energy	University of Louisiana at Lafayette	Co-Optimization of a Fuel-Flexible Micro Gas Turbine and Fuels for Green Power	$73,600.00	$74,395.00	$69,911.00	$217,906.00

Proposal #	PI Name	Category	Institution	Project Title	Amount Requested			
					Year 1	Year 2	Year 3	Total
021B-17	Dr. Mehdi Mokhtari	Clean Technology and Energy	University of Louisiana at Lafayette	Characterization of Complex Fracture Propagation in Naturally Fractured Formations using Digital Image Correlation (DIC) Technique and Simulation	$68,300.00	$91,786.00	$92,347.00	$252,433.00
022B-17	Dr. Emmanuel Revellame	Advanced Materials and Manufacturing	University of Louisiana at Lafayette	Development of an Udder Dip with Extended Period of Effectiveness for Prevention of Bovine Mastitis	$51,185.00	$69,876.00	$49,574.00	$170,635.00
023B-17	Prof. Natalia Sidorovskaia	Coastal and Water Management	University of Louisiana at Lafayette	Development of acoustic monitoring methodology for submarine landslides in the Northern Gulf of Mexico	$122,640.00	$98,410.00	$98,656.00	$319,706.00
024B-17	Dr. Radhey Srivastava	Life Sciences and Bioengineering	University of Louisiana at Lafayette	Catalytic C-H functionalization for the synthesis of organonitrogen compounds and the scale-up studies	$112,497.00	$99,998.00	$94,537.00	$307,032.00
025B-17	Dr. Ramalingam Subramaniam	Clean Technology and Energy	University of Louisiana at Lafayette	Removal of metals from oil and gas industries' wastewater	$64,026.00	$66,152.00	$68,373.00	$198,551.00
026B-17	Dr. Mark Zappi	Clean Technology and Energy	University of Louisiana at Lafayette	Production of Industrial Valuable Lipids from Unicarbonic, Aerobic Microbes	$90,000.00	$90,000.00	$90,000.00	$270,000.00
027B-17	Prof. Khalid El Sayed	Other - Functional food	University of Louisiana at Monroe	Novel extra-virgin olive oil-based functional food for cancer and Alzheimer's disease prevention	$75,000.00	$75,000.00	$75,000.00	$225,000.00
028B-17	Dr. Md Hoque	Life Sciences and Bioengineering	University of New Orleans	Multidimensional Anomaly Detection Algorithms in Big Data for Personalized Medication Administration	$72,268.00	$75,041.00	$75,379.00	$222,688.00

Total Number of Proposals submitted	28
Total Funds Requested for First Year	$2,489,579.00
Total Funds Requested for Second Year	$2,176,685.00
Total Funds Requested for Third Year	$1,834,985.00
Total Funds Requested	$6,501,249.00