Report to the Louisiana Board of Regents

Review of Research Proposals Submitted for Funding Consideration

in the Board of Regents Support Fund R & D Program

Industrial Ties Research Subprogram

February 13, 2020

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REPORT OF THE FINAL PANEL
BOARD OF REGENTS SUPPORT FUND
INDUSTRIAL TIES RESEARCH SUBPROGRAM
FY 2019-20

BACKGROUND INFORMATION

Thirty-six research proposals requesting a total of $2,892,296 for the first year of work were submitted for funding consideration during fiscal year (FY) 2019-20 in the Industrial Ties Research Subprogram (ITRS) component of the Board of Regents Support Fund (BoRSF). Of the thirty-six proposals submitted, two proposals 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 thirty-six 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 13, 2020, to discuss Phase I and II subject-area evaluations, prioritize proposals, and develop funding recommendations. The final panel considered each of the thirty-six active 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 $450,000 would be available in first-year funds for new research projects in the ITRS in FY 2019-20, 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, six proposals were recommended for funding. These six 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.

Ten (10) 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).

One other proposal was considered meritorious by both the subject-area reviewers and the final panel, but was 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 six 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 six 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 the Priority Two proposal **(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 six 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 2020.

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 2019-20 Request for Proposals.

To the Applicants:

Both the grant applicants and institutional administration 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. Successful grants in this program have historically had:

1. A testable scientific hypothesis and supporting preliminary data;
2. Demonstrated research experience among the project team in the proposed field of study;
3. A carefully prepared budget request with thorough justifications of proposed expenditures;
4. Active participation of an industry partner in the research and commercialization;
5. A reasonable industry match that, where possible, includes both in-cash and in-kind support;
6. When appropriate, institutional support in the form of faculty release time, deferment of graduate tuition & fees, and significant contributions to research supplies, equipment, and student travel; and
7. Proposals being resubmitted highlighted changes which are believed to have made the proposal more competitive.

Future proposals submitted would benefit from addressing these elements.

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 levels and types of industrial matching support by June 30, 2020, for the mandated first-year matching commitments; by March 31, 2021, for the required second-year match; and by March 31, 2022, for the required third-year matching commitments. 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) (6)

Rank	Proposal No.	Institution	Recommended BORSF 1st Year Funds	Recommended BORSF 2nd Year Funds	Recommended BORSF 3rd Year Funds
1	025B	MCNEESE	$ 72,500	$ 66,579	$ 56,213
1	005B	LSU-AG	69,500	69,500	69,500
1	012B	LSU A&M	59,000	59,000	------
1	035B	UNO	61,783	58,535	57,076
5	013B	LSU A&M	89,031	86,031	83,531
6	004B	LSU-AG	68,054	68,054	68,054
TOTAL			**$ 419,868**	**$ 407,699**	**$ 334,374**

APPENDIX B*
MERITORIOUS ITRS PROPOSALS RANKED PRIORITY ONE BY THE SUBJECT-AREA PANELS AND CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING (10)

006B 007B 011B 014B 015B 016B 021B 026B 028B 029B

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 2020.

APPENDIX C
MERITORIOUS ITRS PROPOSALS OF LOWER PRIORITIES
(PRIORITY TWO*) (1)

010B

Note: *The panel's comments on the proposal ranked Priority Two is provided in **Appendix C.4.** The subject-area panel review for the proposal will be provided to the applicant in July 2020.

PRIORITY THREE* (19)

001B	022B	036B
002B	023B	-----
003B	024B	-----
008B	027B	-----
009B	030B	-----
017B	031B	-----
018B	032B	-----
019B	033B	-----
020B	034B	-----

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 2020.

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, 2020, 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, 2021, of updated 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, 2022, of updated 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 on company or agency letterhead and signed by authorized representatives of the companies or agencies 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. **Therefore, funding for each recommended Priority One project is made contingent upon full and complete execution of the work plan delineated in the proposal.**

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

Proposal 025B **Rank: 1**

TITLE: *Development of a Novel and Compact Wastewater Treatment Process*

INSTITUTION: McNeese State University

PRINCIPAL INVESTIGATOR: Ramalingam Subramaniam, Ph.D.

COMMENTS: In recent years, significant growth has been experienced in cruise ship tourism. All ships generate a huge volume of black water (sewage) and grey water (cooking and cleaning wastewater). The quantity of wastewater generated depends mainly on the number of passengers, distance travelled and hours of navigation. The composition of black and grey water from cruise ships is very complex and its main constituents include heavy metals, volatile and semi-volatile organics, antibiotics, pesticides, nutrients, pathogens, fecal coliforms, bacteria, oil and grease, detergent and soap residue, solids, and oxygen-depleting substances. The impact of ship wastewater on the marine environment is one of the major burdens to the environment and local communities, with potential effects on human health, aquatic life and climate.

The proposed research represents a collaboration between McNeese State University and H_2O, LLC, Lafayette, LA. The primary objective of the research is to develop a compact, rapid, economical and fully automated commercial technology for ship wastewater application. H_2O, LLC is part of the novel treatment technology's development and has funded a total of $96,262 ($41,232 at McNeese State University and $55,030 at University of Louisiana at Lafayette) towards the development of the proof of concept. The PI should note that marine sanitation engineering is a highly specific and complex area of great importance in both ship building and maintenance. The idea of retrofitting cruise and other ships with the proposed wastewater treatment plant may or may not be practical. Prior literature indicates that a vessel carrying 3,000 passengers and crew would generate 15,000 - 30,000 gallons of black water and 90,000 - 255,000 gallons of grey water. The question remains whether or not a 1K test system will adequately demonstrate the utility of the proposed approach. The panel acknowledges that H_2O, LLC is an expert in the area of wastewater treatment, but is unclear of their position in the area of marine sanitation engineering. Nevertheless, the problem identified is real and H_2O, LLC is considered an excellent partner for the project. H_2O, LLC pledged in-kind support (consulting) valued at $10,000 per year; however, its letter of support was not provided on company letterhead with contact information including the physical address. Therefore, a revised letter of support from H_2O, LLC must be obtained prior to funding. It is recommended that the proposed budget be reduced to limit travel and supplies costs to $3,150 and $11,482, respectively, for a year one budget of $72,500. Budgets of $66,579 and $56,213 are recommended for year two and year three, respectively. The PI is required to maintain support for graduate research assistants (GRAs) and 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, 2020 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	$72,500	$10,000 as specified in the proposal
2nd Year	$66,579	$10,000 as specified in the proposal
3rd Year	$56,213	$10,000 as specified in the proposal

Appendix C.2 (continued)

Proposal 005B **Rank: 1**

TITLE: *Sugarcane Fiber Derived Lignocellulose Nanomaterial for Advanced Fluids and Composite Fiber Applications*

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Qinglin Wu, Ph.D.

COMMENTS: Agriculture is one of Louisiana's most important industries, ranking in the top three along with the petrochemical industry and tourism, contributing a total economic value of over $10 billion each year. A large quantity of biomass including sugarcane bagasse, straw, and forestry residuals is produced each year as part of the agriculture and forestry production process. Most biomass considered as waste and/or fuels (e.g., bagasse in sugar mills) consists of approximately 50% cellulose and 25% each of hemicellulose and lignin, representing a typical lingo-cellulosic material. The PI's ongoing work has demonstrated that the long fiber structure from various biomass materials offers significant advantages for manufacturing lignocellulose nanomaterial (LCNM) for use in composites and fluids, helping create more value-added opportunities for the industry. The goal of the project is to develop industry-oriented technology for manufacturing and using biomass (sugarcane) based LCNMs for advanced fluids and textile fiber application. For the material to be viable for commercial uses, it must (a) offer superior properties (e.g., rheology, processability, strength, and environmental aspects), and (b) be cost-competitive compared with existing technology.

The proposed research represents collaborative efforts between Louisiana State University – Agricultural Center, Haspel, LLC, Baton Rouge, LA, and Pro-Log, Inc., New Iberia, LA. The proposed research seek to use a combined green hydrolysis and microwave energy heating approach to modify manufactured LCNMs into more purified and size-controlled materials. Therefore, the proposed research is to test the hypothesis that LCNMs with well-tuned lignin content and size categories can be combined with other polymer materials to yield high-performance composites and fluids. Although the reviewers perceive a risky feature to the project (LCNMs have not yet been validated as commercially viable in either the petroleum or textile industry), the risk is mitigated by exploring LCNMs for use in two very different industries. Even if one application proves a failure, the other application could be successful. Dr. Wu is a senior scientist with an excellent publication, grant, and GRA training history. Dr. Wu has received considerable funding through State support programs including the ITRS, with an excellent record of working with private industry. This is a well-written proposal by a qualified researcher. The research objectives are clear and well defined. Industry partner Haspel, LLC pledges cash ($2,500) and in-kind ($2,500) support of $5,000 for the three-year project. Industry partner Pro-Log, LLC pledges cash ($5,000) and in-kind ($5,000) support of $10,000 per year. It is recommended that the proposed budget be reduced to provide limited other expense charges of $4,000 for a year one budget of $69,500. Similar budgets of $69,500 are recommended for year two and 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. 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, 2020 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	$69,500	$10,000 as specified in the proposal
2nd Year	$69,500	$10,000 as specified in the proposal
3rd Year	$69,500	$15,000 as specified in the proposal

Appendix C.2 (continued)

Proposal 012B **Rank: 1**

TITLE: *Rolled Scaffold Bioreactor for Biopharmaceutic Production*

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Kidong Park, Ph.D.

COMMENTS: The biopharmaceutical industry, one of the most rapidly growing industry sectors, uses a large population of living cells to produce valuable biopharmaceutic products, such as monoclonal antibodies, vaccines, and protein therapeutics. An efficient and reliable bioreactor to culture cells in a large scale is one of the most essential elements in biopharmaceutical production. The PI seeks to develop next-generation bioreactors based on Rolled Scaffold (RS) to culture cells for biopharmaceutic production.

The proposed research represents a partnership between Louisiana State University and A&M College and Johnson and Johnson (J&J), one of the leading biopharmaceutical companies in the U.S. The PI has been developing a RS that has strong potential to replace conventional stirred bioreactors in biopharmaceutical industries. RS is a massive array of identical microfluidic channels. Cells are grown on the inner surfaces of the channels while growth media flows through the channels in a laminar manner. RS can provide very large surface area for cell culture and gentle laminar flow minimizes shear stress on cells. Moreover, the use of RS separates cells from the media reservoir, allowing novel bioreactor configurations for efficient usage of growth media. The PI has successfully demonstrated a small/mid-scale culture of adherent cells and the basic functionalities of the RS experimentally. The PI is currently commercializing the RS technology with the support and active partnership of J&J. J&J is providing support for the experimental evaluation of the RS technology with their cell lines, in addition to stationing a Ph.D. research associate located at LSU and paid directly by J&J. The overall goal is to develop a fully automated pilot-scale RS bioreactor and assist J&J in building an identical RS bioreactor at their expense. The pilot RS bioreactor at J&J will be used for the optimization, validation, and evaluation of the biopharmaceutic production with the RS technology. If successful, the RS technology will be licensed to J&J following the pre-negotiated technology licensing agreement of June 2019. The novelty of the research and the considerable upfront commitment from J&J further justify support for the project. This is a thorough and well-written proposal. The overall budget is acceptable, less travel, which appears inflated. J&J pledged cash support of $30,000 per year, although the year two budget did not include this amount. Moreover, J&J's letter of support was not submitted on company letterhead and continued participation is based on their annual decision. Regardless, the project budget should reflect the year two industry match of $30,000. It is recommended that the proposed budget be revised to limit travel costs to $2,000, resulting in a year one budget of $59,000. A similar budget of $59,000 is recommended for year two. Finally, an updated letter of support from J&J on company letterhead must be obtained. 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 stated in the proposal should be maintained <u>in full</u>. Funding is contingent upon receipt by the Board no later than June 30, 2020 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	$59,000	$30,000 as specified in the proposal
2nd Year	$59,000	$30,000 as specified in the proposal

Appendix C.2 (continued)

Proposal 035B **Rank: 1**

TITLE: *Low Temperature High Voltage Sodium/Immiscible Salts Battery for Grid-Scale Electrical Energy Storage*

INSTITUTION: University New Orleans

PRINCIPAL INVESTIGATOR: Viktor Poltavets, Ph.D.

COMMENTS: The renewable energy sector, including solar and wind power, is growing quickly. It is expected that the cost of renewable energy will become lower than that of fossil fuels in 2020. Prices could become as low as three cents per kilowatt-hour for onshore wind and solar photovoltaic projects. However, solar and wind power are intermittent in nature; therefore, they can only come into use if large-scale energy storage systems are available. While different approaches to these large-scale energy storage systems have been suggested, this proposal is focused on a new battery design for electrical energy storage systems. The proposed research addresses a critical need of a grid-scale energy storage for a low-temperature high-voltage sodium battery with a simple manufacturing process and utilizing only cheap and abundant materials. The battery design includes a Na/K metal anode, molten salt (ionic liquid) electrolyte and insoluble transition metal salt cathode. The components stratify by density into distinct layers due to a mutual immiscibility of the metal and the salt components (no solid-state electrolyte is used). Two critical innovations in the proposed battery design relative to the state-of-the-art molten metal battery are (1) the use of ionic liquids allows low operation temperature; and (2) metal salt cathodes lead to much higher open circuit voltage in comparison with the molten metal batteries currently developed by Ambri, Inc. Preliminary data show good battery cycling even at room temperature. The low battery cost per energy stored and scalability of the design can catalyze a widespread grid-scale energy storage adoption.

The proposed research represents a collaboration between the University of New Orleans and Advano, a Louisiana-based advanced materials company located on the UNO campus. Molten metal batteries are much talked about, but no commercial application is known to the panel. Overall, the goal of the proposed work is the development of the new battery design that will allow the PI to become competitive for federal funding, with subsequent manufacturing Louisiana. If successful, industry partner Advano's experience in attracting venture capital and bringing technology to market would ensure that the project contributes to battery manufacturing and clean energy sectors in Louisiana. This is a good proposal by a well-qualified researcher. The overall budget is acceptable, less supplies, which appear inflated. The panel noted that the institution did not provide a tuition waiver for the GRA supported by the project. The institution should reconsider this omission, as GRA support should not only include wages, but tuition support as well. Industry partner Advano pledged in-kind support (in-house battery testing and consulting) valued at $30,500 for year one, $33,000 for year two, and $36,750 for year three. It is recommended that the proposed budget be revised to reduce supplies charges by $3,000 for each year of the project, resulting in a year one budget of $61,783. Budgets of $58,535 and $57,076 are recommended for year two and year three, respectively. The PI is required to maintain support for graduate research assistants (GRAs) and 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, 2020 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	$61,783	$30,500 as specified in the proposal
2nd Year	$58,535	$33,000 as specified in the proposal
3rd Year	$57,076	$36,750 as specified in the proposal

Appendix C.2 (continued)

Proposal 013B **Rank: 5**

TITLE: *Development of Gas-Assisted Gravity Drainage [GAGD] Process for Improving Oil Recovery from Tuscaloosa Marine Shale [TMS] Resource in Louisiana*

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Dandina Rao, Ph.D.

COMMENTS: Oil production has suffered a dramatic decline in Louisiana since it peaked in 1970. To put this in perspective, around 470 million barrels were produced in 1970, compared to 40 million barrels in 2017—a 91% reduction in 47 years. However, crude oil production in the U.S. in the past few years has hit record levels due to the discovery and tremendous success of two technologies applied to unconventional tight oil (shale) reservoirs: horizontal drilling and hydraulic fracturing. Tuscaloosa Marine Shale (TMS) in Louisiana falls into this category of reservoirs but has not received significant attention. It is imperative that research is initiated into finding ways to recover more oil from this enormous resource, estimated to contain 7 billion barrels of oil. Because of the tight nature of TMS rocks with ultra-low permeabilities, only about 3-7% of the oil can be recovered by the primary pressure depletion process. This would mean that over 93% of the original oil in place will be left unrecovered in TMS.

The proposed research is a collaborative effort between Louisiana State University and A&M College, Schlumberger, and Goodrich Petroleum. The PI has developed an enhanced oil recovery process, Gas-Assisted Gravity Drainage (GAGD), that has been patented by LSU, which promises to offer the potential to recover more than 75% of this left-behind oil. The project aims to develop the GAGD process through laboratory experiments to demonstrate its suitability for application in Louisiana's TMS and quantify the oil recovery potential. A 20% improvement in TMS recovery would amount to 1.4 billion barrels of produced oil, or $70 billion in revenue based on $50/bbl value. This a well-written proposal by a qualified researcher. The PI has an existing grant with China National Petroleum Corporation (CNPC) USA on what appears to be a similar project in the amount of $620,000 for the period 10/01/2018 – 9/30/2020. The PI also has a pending proposal with Kuwait Oil Company in the amount of $1,245,546 for the period 10/01/2019 – 9/30/2022. Industry partner Schlumberger pledged cash support of $25,000 per year. Goodrich Petroleum has agreed to provide support (no estimated value) for the project in the form of rock samples from productive zones of TMS, fluid (oil and brine) samples from TMS reservoirs, all relevant data on fluid and rock properties, and geological characteristics. The overall budget is acceptable. It is recommended that the project be funded at the level requested, i.e., $89,031 for year one, $86,031 for year two, and $83,531 for year three.

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, 2020 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	$89,031	$25,000 as specified in the proposal
2nd Year	$86,031	$25,000 as specified in the proposal
3rd Year	$83,531	$25,000 as specified in the proposal

Appendix C.2 (continued)

Proposal 004B **Rank: 6**

TITLE: *Biomass-Bioplastic Blended Pellet as Media for Total Nitrogen Treatment of Wastewater*

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATOR: Chandra Theegala, Ph.D.

COMMENTS: Biological treatment in municipal and animal wastewater treatment systems results in enormous quantities of ammonia that are converted to nitrate and discharged into the receiving waterbodies, causing grave environmental consequences such as Dead Zones and Red Tides in the Gulf of Mexico. Presently, there is heavy emphasis on treatment options aimed at achieving total nitrogen removal instead of ammonia conversion. One promising method for lowering high nitrate concentrations is biological denitrification. This process involves conversion of nitrates to nitrogen gas by denitrifying bacteria. The ideal strategy for denitrification is to allow the bacteria to grow on the surface of a granular carbonaceous material, drawing their carbon and energy from the breakdown of carbonaceous material, while drawing the nitrate from the passing water. Polyhydroxyalkanoates (PHA's) are an emerging bioplastic that is produced commercially by genetically modified bacteria. The research team proposes to blend PHA's with low-value agricultural byproducts to create a plasticized, hardened, and low-cost composite pellet that is suitable for denitrification.

The proposed research represents collaboration between Louisiana State University – Agricultural Center and Aquaculture Systems Technology (AST), LLC, Baton Rouge, LA. Specific research objectives are (1) screen various wood and agriculture residues for blending with PHAs; (2) optimize the production of blended pellets using plastic extruders and biomass pelletizers; (3) adjust density of the blended beads with infused gases and foaming agents; (4) evaluate pellet wet integrity, abrasion resistance and material properties; (5) assess denitrification potential of composite beads with controlled experiments using both fresh and marine wastewaters; (6) develop biofilter sizing protocols and guidelines; and (7) conduct economic analysis on the use of PHA-blended denitrification pellets for various wastewaters and aquaculture applications. If successful, the research has the potential to meet important environmental and industrial needs. The PI states that ". . . as there is no prior literature on wood fiber suitability for blending with PHA for wet denitrification applications, a wider range of agricultural products will be screened. The choice of screening materials will be based on abundance, underutilization, disposal costs (if any) and material properties. A thorough literature search will be first conducted and will be used to create a weighted decision matrix . . . ". Generally, the panel expects researchers to have a fairly good knowledge base on current research in the area prior to submitting a proposal. However, this a good proposal by team of well-qualified researchers. Industry partner AST pledges in-kind support (six commercially marketed bead filters, consulting, student internship, supplies, and laboratory analysis) valued at $47,645. It is recommended that the proposed budget be reduced to limit travel charges to $2,000 and supplies charges to $3,000 for a year one budget of $68,054. Similar budgets of $68,054 are recommended for year two and year three. The PI is required to maintain support for graduate research assistants (GRAs) and students at the level proposed 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 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, 2020 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	$68,054	$12,913 as specified in the proposal
2nd Year	$68,054	$17,366 as specified in the proposal
3rd Year	$68,054	$17,366 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 006B

TITLE: Application of Distributed Fiber Optic Sensing for Improving Well Control

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Mauricio Almeida, Ph.D.

COMMENTS: The oil and gas drilling industry has many misconceptions about the effects of gas in risers. These misconceptions lead to not properly dealing with the presence of gas in risers and creating scenarios for potential accidents such as the occurrence of an uncontrollable blowout with loss of equipment, damages to the environment, and, worst of all, the loss of life. Since there have been no convincing explanations of what is happening inside the riser during a gas influx and how easily it can be managed, the industry has become extremely paranoid about the safety of the riser and the ability of existing set-up and procedures to manage incidents safely. Distributed Pressure Sensing (DPS) is an emerging field in distributed fiber optic sensing where pressure sensors are distributed along an optical fiber to measure continuous pressure data. The use of DPS systems attached to the marine riser will provide real-time information about the pressure status inside the riser and the amount and position of the gas if it entered the marine riser. Although the PI has identified four important questions that industry would like answered, it is unclear what the investigators propose to do with the data obtained. The proposal requires more discussion on the use of an optical integrator along with a description of the frequency domain analysis. The panel finds the cost of fiber optic rental a major concern.

Proposal 007B

TITLE: Resilience-Based Integration of Solar Energy with Critical Infrastructure Under Hurricanes

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Aly Mousaad Aly, Ph.D.

COMMENTS: Louisiana's economy primarily relies on the fishery, agriculture, and oil industries. With recent falling oil prices, the economy is impacted. The proposed project aims to diversify Louisiana's economy by seeking economic benefits from additional industries. Solar energy is one of the fastest growing industries worldwide. The proposed project focuses on improving solar energy technology by developing innovative experimental and computational methods for large-scale product testing that will improve the resilience of the solar energy infrastructure. The work appears completely application-dependent. Each installation would require a large modelling effort, which is probably more costly than simply to make improvements in the infrastructure. The panel views the overall premise of the proposal as economically inefficient.

Appendix C.3 (continued)

Proposal 011B

TITLE: A Data-Driven Approach for Enhancing Electric Power Grid Resilience Against Flood-Induced Hazards

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Celalettin Ozdemir, Ph.D.

COMMENTS: Recurring extreme weather events and fast-paced digitalization of today's society demand higher resilience of electric power systems, especially in the state of Louisiana, which seems to be disproportionately affected by extreme weather events. Yet, the power industry is not equipped with the tools to systematically and proactively protect power grids before and during a flood event. The objective of the project is to develop a framework for flood-induced inundation forecasting for proactive protection of power grid substations, thus enhancing the power grid resilience for each flood-induced phenomenon at each specific geographical zone. Nonparametric methods and machine learning-based algorithms will be developed to estimate spatiotemporal flood level probability distribution functions (PDF). The proposal focuses on one area (Amite River Basin). This is a resubmission in which the research team has addressed several weaknesses. Tackling this problem would have a large economic impact on Louisiana and other areas, if true solutions can be found. However, it is going to be very difficult to test the predictive value unless another flooding disaster occurs. Limited detail is provided regarding optimization except for solar generation, which probably does not make sense in the case of a hurricane. The determination of matrices is proposed, but it is hard to see how this can be found in real-time (costs, availability, outage magnitude) during an event that has huge variances. Industry partner Entergy indicates it "would consider an in-kind match of up to $103,000 over the course of the project" subject to final details, although the circumstances allowing for such an increase in support were not clear. The in-kind match from Entergy ($103,500) seems grossly inflated for services rendered considering that Entergy gets to see the data. The inclusion of a climatologist is a major plus to the proposal's revision. However, project support (0.3 months summer salary) for Dr. Trepanier (climatologist) is completely insufficient, considering that she is a key addition to the research group and plans to co-supervise a graduate student (two are requested). The salary support for the large number of investigators was poorly justified. The resource allocation piece is considered the weakest part of the proposal, where it is up to energy companies to validate the work.

Proposal 014B

TITLE: Application of Distributed Fiber Optic Sensing for Sand Detection in Offshore Production

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Jyotsna Sharma, Ph.D.

COMMENTS: Excessive sand production can cause significant damage to a well's production equipment, both in the wellbore and at the surface, possibly requiring the well to be shut down and need expensive repairs. The objective of the project is to develop an algorithm to detect sand ingress location and volume in real time using a fiber-optic distributed temperature (DTS) and acoustic (DAS) system with a focus on safer offshore operation. Although the goals are somewhat different, two proposals (014B and 006B) utilize the same base technology in identical areas, i.e., industrial offshore well safety and maintenance. This proposal is for detection only without remediation; unfortunately remediation will still be needed. The economic utility is less clear than that of proposal 006B. Since the base technology is very similar, why is small-scale testing relevant if large-scale testing is to occur in year two; and what is gained by the initial tests? Alternative instrumentation using a variety of acoustic techniques is well established, although such methods have clear drawbacks. It is unclear if the proposed technology presents real advantages. The testing procedures are of interest and seem both appropriate and sophisticated. Most of the work appears to be already supported by a large grant. Dr. Sharma has significant National Academy of Science (NAS) support through November 2020 for what appears to be a related project. Industry partner Derrick will donate equipment valued at $38,000. Shell Exploration & Production Co. pledges in-kind support (consulting) valued at $20,000 per year. The panel finds it difficult to see the need for two proposals applying identical technology in the same industrial space.

Appendix C.3 (continued)

Proposal 015B

TITLE: Achieving Commercial Scale Algae Cultivation for Sustainable Nutraceutical Production

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Samuel Snow, Ph.D.

COMMENTS: The growth of algae as a crop is a recent development that has been named 'algaculture' and, as of 2018, algaculture operations receive the same tax and regulatory advantages as traditional crop growers. Microalgae cells offer a variety of possible benefits when cultured, harvested, and processed properly, because they act as microscopic biochemical reactors that convert CO_2, sunlight, and nutrients into useful chemicals. In this project, the PIs use a specialized algae species that possesses a marked ability to produce three independent compounds that belong to different markets: EPA (omega-3 fatty acid), fucoxanthin, and bioplastics. Successful production of these nutraceuticals has been demonstrated with a pilot-scale batch cultivator, but commercialization of this biotechnology requires a transition from limited batch operation to a recirculating system with continuous growth, continuous harvesting, and on-line water treatment. This proposal seeks to optimize commercial production of "Algaculture". The major problem is return on the investment (both capital and otherwise). The claim of markets for the proposed products was not justified. There is skepticism that algal-based biodegradables have any cost advantage, particularly if nutraceutical products are going to drive the cost of production. Demand is often based on the nutraceutical market, which may or may not expand. Biodegradable plastics are a more appealing target, but the path from project research to the bioplastics market is unclear and the competition is fierce. Large-scale open raceway design will require a huge capital investment. It may not be easy to scale up microwave and ultrasonic procedures. Carbonization of biomass is hardly a green technique and also requires considerable energy input.

Proposal 016B

TITLE: Developing a Holistic Structural Health Monitoring System for Offshore Wind Farms

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Chao Sun, Ph.D.

COMMENTS: Offshore wind farms are becoming increasingly attractive due to deteriorating environmental conditions and changing climate. However, because of severe marine conditions such as strong winds, waves, current, thunderstorms and corrosion, the offshore wind turbines (OWTs) suffer from various types of severe damage during service life, which impair power output and structural safety, and increase the production cost. Therefore, long-term efficient structural health monitoring (SHM) of the OWTs is essential to ensure the wind turbine performance and reduce electricity prices. Unfortunately, an efficient holistic SHM system for online damage diagnosis of OWTs is lacking. The proposed research is to develop a holistic SHM system to provide exact early warnings of damage and guidance for optimized operation and maintenance of offshore wind farms. This is a structural finite element (FE) modeling project that includes a camera for combining vibration with vision. The PI did not explain the logic of coupling vision and vibration monitoring. It is not clear why the PI seems to think this is important to improving structural health monitoring for offshore wind farms. A principal weakness of this application is that the PI does not differentiate the proposed work from those existing systems indicated in the proposal. Since integration is the basis for the proposed system, the proposal should have explained what distinguishes this work from that of others, i.e., what is unique to this proposal.

Appendix C.3 (continued)

Proposal 021B

TITLE: A Novel Nano/Micro Biomatrix Material for Controlled Nitric Oxide and Hydrogen Sulfide Generation

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Mark DeCoster, Ph.D.

COMMENTS: Nitric Oxide (NO) and Hydrogen Sulfide (H_2S), are two increasingly important signaling molecules known as gasotransmitters. These transmitters are generated by the body and in controlled doses carry out essential functions. H_2S is also found in the gas and petroleum industry and can be a hazard if not detected in time to intervene with safety precautions. Due to their volatility and transient nature, NO and H_2S may be a challenge to detect. The PI suggests that the availability of novel materials for controlled delivery of NO and/or H_2S could be of great commercial value for (1) the development of NO and H_2S positive controls and calibration sources for sensors; (2) providing controlled delivery of gasotransmitters to biological systems; and (3) driving novel catalytic processes due to the reactivity of both NO and H_2S. The PI and his laboratory have discovered a novel nanoscale material that is a biohybrid of a metal and an amino acid. The material is called CuHARS (copper high-aspect ratio structures) and is completely biodegradable. Recent work in the PI's lab has demonstrated via four independent methods that CuHARS catalyzes generation of gases, including NO and H_2S. The team will incorporate CuHARS into cellulose for NO generation and determine the biomedical effects. The PI proposes to use such matrices as they are beneficial in terms of cost and can be scaled in size and used in large-scale production. It is not clear what the main goal of the production of the cellulose CuHARS material will be. The PI notes additional information on the kinetics of volatile gas generation by showing bubble production in liquid and also in a quantifiable kinetic assay—why? There is also indication of H_2S generation, but this is based solely on the deposition of a yellow-colored material in sealed vessels. The claims of utility for biomedical applications appear somewhat extreme at present. Certainly, introduction of NO into vascular cells will have effects and their cell system may or, may not be specific for it (formation of lumens by brain microvascular cells in culture). Without many controls, the panel questions the utility of this as an indicator system. Overall the proposal is unclear as to what CuHARS is and what it does. It should be noted that copper is toxic and may be a neurotoxin, hence the fact that CuHARS is biodegradable raises the issue of the toxicity of breakdown products. The assay for breakdown is a bit unclear. There are questions that must be answered, e.g., (1) is the physical breakdown of particles being measured; and (2) what is released from the particles? Industry partner Innolyser Labs, LLC pledges cash and in-kind support valued at $12,500 for year one and year two, and $8,500 for year three. The panel views the proposal as far too broad in scope and notes that the proposal does not provide the necessary background information for evaluation. Similar to the previous submission, there seems to be a lack of concentration on a specific application/project. The proposal has been somewhat extended in terms of presentation of results.

Appendix C.3 (continued)

Proposal 026B

TITLE: Scalable Manufacturing of High-Performance Anodes for Li-ion Batteries

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATOR: Michael Naguib, Ph.D.

COMMENTS: Most commercial Li-ion batteries (LIBs) contain graphite anodes. An attractive alternative is to use silicon, which has a much higher Li capacity than graphite. Attempts have been made by battery manufacturers to introduce silicon into the graphite anodes without disturbing the well-established LIBs manufacturing processes. The problems with the current silicon-graphite anodes include (1) large consumption of Li in the first cycle and gradual loss in subsequent cycles, (2) huge internal stress fluctuations and floating interface damages the cells, and (3) solid electrolyte interphase (SEI) stabilization collapses due to the inability to accommodate the volume changes. Working with experts at Advano, the PI will utilize a Reduced Graphene Oxide (rGO) encapsulated functionalized Silicon Nanoparticle (SiNP). The PI proposes a 3D printing and light-based sintering technique that is feasible and uses emerging technologies for a new application, although the photonic curing would seem to require a great deal of work to implement. The aim of the material is to decrease battery loss, especially in the first few cycles. This is good proposal with a sound research and achievable goals. However, the proposal would have benefited from a better economic justification. The economic case for Louisiana is not unique and doesn't concentrate on locally characteristic industries. Industry partner Advano is appropriate industry partner but considered a relatively small player in the area. This is an expensive project that requires an equipment purchase of $47,000. The travel budget appears inflated and should be reduced. The PI should note that the project budget would require significant revision, if the proposal were to be funded.

Proposal 028B

TITLE: Sustainable Adhesives and Composites by Combination of Soybean and Wastewater Treatment Plant Sludge Proteins – Without and With Protein Extraction/Purification – as a Means of Producing Low-Cost, Green Wood Products

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: William Chirdon, Ph.D.

COMMENTS: The goal of the proposed work is to develop profitable and well-performing adhesives for entrance into the growing protein-based adhesive market. Targeted adhesive feedstocks for this project are either (1) a mixture of soybean and biosolids proteins or (2) proteins from biosolids. The PI has developed a technology for converting microalgal proteins from delipified cakes into adhesives, demonstrating that proteins from microbial sources can make high-quality adhesives. The project team has generated results indicating that proteins derived from wastewater treatment plant sludges can also produce strong adhesives. Results include prototype materials which have mechanical properties equivalent to conventional particleboard composites. Although the claims of using microalgal cakes are interesting, economically, adhesive production is unlikely to drive the microalgal production market. Its use only becomes practical when the microalgal industry becomes mature (which may not happen). Wastewater sludge, although a tempting source of material, brings up the problem of acceptability and toxicity. There are questions that remain to be answered, e.g., (1) what heavy metals and organic pollutants are present in the sludge; (2) are there any potential biohazards; and (3) will consumers want a product that may well contain animal slaughter proteins? These questions should be considered and answered. Beyond these concerns, this is an impressive proposal and a capable team of researchers.

Appendix C.3 (continued)

Proposal 029B

TITLE: Investigation of Smart Control Strategies to Enhance Future Electric Power Delivery and Management in Louisiana

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Farzad Ferdowsi, Ph.D.

COMMENTS: Energy efficiency and security are critically important in contemporary power systems due to the high level of dynamics in power sources and power electronic-based components (PEC). Grid-connected solar installations in Louisiana went from essentially zero in 2008, to today having over 140 MW of installed solar capacity due to state and federal incentives. As the tax credits for residential solar photovoltaics (PVs) are being phased out, there will be an inclination towards large-scale solar PVs; however, the grid-support functions of solar inverters are not well understood yet. Furthermore, power systems in the state of Louisiana are prone to natural disasters such as floods and hurricanes. Therefore, developing intelligent control strategies to enable the reliable, resilient and stable operation of future power grids in Louisiana is of importance. The proposal did not provide sufficient information about how modeling and equipment design would be approached. The proposal primarily addresses preventative methods. Modeling is difficult and details of signal analysis were not provided. The proposal is very diffuse and would benefit greatly from being more specific, as it is hard to determine the priorities of the investigators given currently available systems for insuring grid stability.

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

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

Proposal 010B

TITLE: Virtual Co-Presence for Enhanced Safety Training and Planning in Construction and Manufacturing

INSTITUTION: Louisiana State University and A&M College

PRINCIPAL INVESTIGATOR: Xin Li, Ph.D.

COMMENTS: Immersive virtual environments have been effectively applied in many contexts including safety planning and training. Most existing systems only support the acquisition of a single user's behavior. They cannot be used to simulate a shared environment where behaviors are triggered and affected by interactions of multiple persons. Supporting such a virtual environment with strong co-presence and interaction is critical in safety planning and training. To support effective co-presence, existing 3D data processing techniques are insufficient. Developing efficient behavior capturing and modeling techniques using cutting-edge AI algorithms could potentially tackle existing technical gaps between data acquisition/processing bandwidth and animation accuracy. The PI proposes an AI environment for multiple interactions in industrial settings. The panel views this as a huge task that is not likely to be accomplished in the intended timeframe. The PI provided a good set of steps to move the work forward but did not indicate what would be the final impact. The idea of virtual co-presence in a shared environment is not new, but the application is interesting. Multiplayer virtual reality (VR) games exist, and many more complex environments are currently being programmed. The work proposed is extremely challenging. Support of the Construction Industry Advisory Council (CIAC) certainly adds to the proposal. However, additional industrial support should be provided. The proposed budget requested considerable funds for a computer workstation in addition to travel, which appears inflated. The panel notes the change in PI from the 2019 proposal to the 2020 proposal. Nevertheless, the researchers are well versed in the area, especially Dr. Zhu. Dr. Xin Li has an existing BoRSF project on reconstruction of flooding hydrographs that extends from 06/01/18 until 06/30/21.

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.

Coastal and Water Management

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

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

APPENDIX E

SUMMARY OF PROPOSALS SUBMITTED TO THE INDUSTRIAL TIES RESEARCH SUBPROGRAM (ITRS) FY 2019-20

Proposals Submitted to the Research and Development Program - ITRS for the FY 2019-20 Review Cycle

Proposal #	PI Name	Category	Institution	Project Title	Amount Requested			
					Year 1	Year 2	Year 3	Total
001B-20	Dr. Kayanush Aryana	Advanced Materials and Manufacturing	Louisiana State University Agricultural Center	Removal of toxic arsenic from rice raw materials for use in manufacturing a wide variety of safer foods facilitating a healthier population and boosting Louisiana economy	$79,978.00	$79,978.00	$79,978.00	$239,934.00
002B-20	Dr. Joan King	Life Sciences and Bioengineering	Louisiana State University Agricultural Center	High Value Products from Microalgal Biomass	$105,690.00	$99,901.00	$98,901.00	$304,492.00
003B-20	Dr. Subramaniam Sathivel	Advanced Materials and Manufacturing	Louisiana State University Agricultural Center	Crawfish flavor powder, water-soluble chitosan, and encapsulated astaxanthin from Louisiana crawfish shells for nutraceutical and food ingredients markets	$66,910.00	$58,410.00	$0.00	$125,320.00
004B-20	Dr. Chandra Theegala	Coastal and Water Management	Louisiana State University Agricultural Center	Biomass-Bioplastic Blended Pellet as Media for Total Nitrogen Treatment of Wastewater	$74,054.00	$72,225.00	$72,445.00	$218,724.00
005B-20	Qinglin Wu	Advanced Materials and Manufacturing	Louisiana State University Agricultural Center	Sugarcane Fiber Derived Lignocellulose Nanomaterial for Advanced Fluids and Composite Fiber Applications	$69,500.00	$70,500.00	$70,500.00	$210,500.00
006B-20	Dr. Mauricio Almeida	Clean Technology and Energy	Louisiana State University and A & M College	Application of Distributed fiber optic sensing for improving well control	$120,200.00	$100,000.00	$99,672.00	$319,872.00
007B-20	Prof. Aly Mousaad Aly	Clean Technology and Energy	Louisiana State University and A & M College	Resilience-Based Integration of Solar Energy with Critical Infrastructure under Hurricanes	$54,431.00	$49,931.00	$49,931.00	$154,293.00
008B-20	Prof. Steve C.S. Cai	Other - coastal hazards and mitigations	Louisiana State University and A & M College	Cost Effective Engineered Rehabilitation and Construction of Residential Houses in Coastal Communities	$78,000.00	$70,500.00	$63,500.00	$212,000.00
009B-20	Dr. Yong-Cheol Lee	Coastal and Water Management	Louisiana State University and A & M College	Developing Disaster Debris Prediction and Management Frameworks by Integrating Urban-Level Building and Infrastructure Data	$72,890.00	$72,726.00	$72,426.00	$218,042.00
010B-20	Prof. Xin Li	Digital Media and Enterprise Software	Louisiana State University and A & M College	Virtual Co-presence for Enhanced Safety Training and Planning in Construction and Manufacturing	$65,399.00	$59,699.00	$59,199.00	$184,297.00
011B-20	Dr. Celalettin Ozdemir	Clean Technology and Energy	Louisiana State University and A & M College	A Data-driven Approach for Enhancing Electric Power Grid Resilience against Flood-induced Hazards	$88,665.00	$88,165.00	$87,165.00	$263,995.00
012B-20	Prof. Kidong Park	Life Sciences and Bioengineering	Louisiana State University and A & M College	Rolled Scaffold Bioreactor for Biopharmaceutic production	$61,000.00	$60,000.00	$0.00	$121,000.00
013B-20	Dr. Dandina Rao	Clean Technology and Energy	Louisiana State University and A & M College	Development of Gas-Assisted Gravity Drainage [GAGD] Process for Improving Oil Recovery from Tuscaloosa Marine Shale [TMS] Resource in Louisiana	$89,031.00	$86,031.00	$83,531.00	$258,593.00
014B-20	Dr. Jyotsna Sharma	Clean Technology and Energy	Louisiana State University and A & M College	Application of Distributed Fiber Optic Sensing for Sand Detection in Offshore Production	$85,799.00	$84,949.00	$84,334.00	$255,082.00
015B-20	Dr. Samuel Snow	Life Sciences and Bioengineering	Louisiana State University and A & M College	Achieving commercial scale algae cultivation for sustainable nutraceutical production	$149,973.00	$99,971.00	$98,905.00	$348,849.00
016B-20	Dr. Chao Sun	Digital Media and Enterprise Software	Louisiana State University and A & M College	Developing a holistic structural health monitoring system for offshore wind farms	$69,503.00	$70,056.00	$70,629.00	$210,188.00
017B-20	Dr. Charles Taylor	Life Sciences and Bioengineering	Louisiana State University and A & M College	Material Characterization of Amniotic Tissue	$75,030.00	$69,580.00	$67,830.00	$212,440.00
018B-20	Dr. Gregory Upton	Clean Technology and Energy	Louisiana State University and A & M College	Integrating Utility Scale Solar and Storage into the Transmission Grid: An Economics and Engineering Approach	$74,124.00	$78,184.00	$44,056.00	$196,364.00
019B-20	Dr. Timothy Foster	Life Sciences and Bioengineering	Louisiana State University Health Sciences Center - New Orleans	Optimization of Novel Selective 5HT2A Receptor Agonists for Ocular Therapeutic Indications: Enhancement and Extension of Currently Licensed Composition of Matter and Method of Use Technologies	$100,000.00	$100,000.00	$100,000.00	$300,000.00

Proposals Submitted to the Research and Development Program - ITRS for the FY 2019-20 Review Cycle

Proposal #	PI Name	Category	Institution	Project Title	Amount Requested			
					Year 1	Year 2	Year 3	Total
020B-20	Dr. Henry Cardenas	Advanced Materials and Manufacturing	Louisiana Tech University	Electrochemical Control of Fatigue Cracks	$84,674.00	$79,999.00	$78,999.00	$243,672.00
021B-20	Dr. Mark DeCoster	Life Sciences and Bioengineering	Louisiana Tech University	A NOVEL NANO/MICRO BIOMATRIX MATERIAL FOR CONTROLLED NITRIC OXIDE AND HYDROGEN SULFIDE GENERATION	$53,899.00	$51,499.00	$50,199.00	$155,597.00
022B-20	Dr. C. Shawn Sun	Advanced Materials and Manufacturing	Louisiana Tech University	Development of Ultra-high Performance Concrete Using Locally Available Materials	$74,274.00	$68,338.00	$62,711.00	$205,323.00
023B-20	Prof. Nazimuddin Wasiuddin	Advanced Materials and Manufacturing	Louisiana Tech University	A Novel and Cost-Effective Warm Mix Asphalt Additive Developed from an Industrial Waste in Louisiana: Field Trials and Advanced Laboratory Tests	$71,102.00	$63,898.00	$0.00	$135,000.00
024B-20	Dr. Chester Wilson	Clean Technology and Energy	Louisiana Tech University	Commercialization of Polymer Perovskite Solar Cells Carbon Encapsulated for Enhanced Lifetime	$64,800.00	$52,000.00	$42,000.00	$158,800.00
025B-20	Dr. Ramalingam Subramaniam	Coastal and Water Management	McNeese State University	Development of a Novel and Compact Wastewater Treatment Process	$75,316.00	$67,279.00	$56,913.00	$199,508.00
026B-20	Dr. Michael Naguib	Advanced Materials and Manufacturing	Tulane University	Scalable manufacturing of high-performance anodes for Li-ion batteries	$149,541.00	$98,959.00	$96,964.00	$345,464.00
027B-20	Dr. Kyriakos Papadopoulos	Other - tobacco waste treatment	Tulane University	Aqueous two-phase nicotine extraction	$53,863.00	$60,256.00	$60,661.00	$174,780.00
028B-20	Dr. William Chirdon	Clean Technology and Energy	University of Louisiana at Lafayette	Sustainable Adhesives and Composites by Combination of Soybean and Wastewater Treatment Plant Sludge Proteins – Without and With Protein Extraction/Purification – as a Means of Producing Low-Cost, Green Wood Products	$104,513.00	$99,986.00	$99,678.00	$304,177.00
029B-20	Dr. Farzad Ferdowsi	Clean Technology and Energy	University of Louisiana at Lafayette	Investigation of Smart Control Strategies to Enhance Future Electric Power Delivery and Management in Louisiana	$103,582.00	$90,320.00	$58,056.00	$251,958.00
030B-20	Dr. Daniel Gang	Clean Technology and Energy	University of Louisiana at Lafayette	Capture of Oil and BTEX from Hydraulic Fracturing Flowback Water Using Advanced Superhydrophobic Adsorption Systems	$62,181.00	$63,465.00	$64,799.00	$190,445.00
031B-20	Prof. Boyun Guo	Clean Technology and Energy	University of Louisiana at Lafayette	Investigation of Low-dimension Particle Bridging Mechanism for Extracting Natural Gas from Offshore Gulf of Mexico Gas Hydrates Using Frac-Packing Method	$73,112.00	$50,505.00	$52,731.00	$176,348.00
032B-20	Dr. Xiali Hei	Digital Media and Enterprise Software	University of Louisiana at Lafayette	Non-invasive Schemes and Device Development for Hypoglycemia and Hyperglycemia False/Suppressed Alarm Detection and Early Diagnoses	$83,956.00	$73,222.00	$60,108.00	$217,286.00
033B-20	Dr. Ning Liu	Clean Technology and Energy	University of Louisiana at Lafayette	The use of nanoparticles to seal cement fractures in wells	$81,761.00	$79,327.00	$76,951.00	$238,039.00
034B-20	Dr. Md Hoque	Life Sciences and Bioengineering	University of New Orleans	Effective Anomaly Detection in Omics Big Data for Precision Medicine	$68,664.00	$71,188.00	$73,330.00	$213,182.00
035B-20	Prof. Viktor Poltavets	Advanced Materials and Manufacturing	University of New Orleans	Low Temperature High Voltage Sodium/ Immiscible Salts Battery for Grid-Scale Electrical Energy Storage	$64,783.00	$61,535.00	$60,076.00	$186,394.00
036B-20	Prof. Vincent Yu	Other - Offshore Oil and Gas Industry	University of New Orleans	Guidance Development for Dropped Object Prevention Program in Offshore Oil and Gas Operations	$42,098.00	$33,864.00	$19,875.00	$95,837.00

Total Number of Proposals submitted	36
Total Funds Requested for First Year	$2,892,296.00
Total Funds Requested for Second Year	$2,636,446.00
Total Funds Requested for Third Year	$2,317,053.00
Total Funds Requested	$7,845,795.00