

**REPORT OF THE FINAL PANEL**  
**BOARD OF REGENTS SUPPORT FUND**  
**INDUSTRIAL TIES RESEARCH SUBPROGRAM**  
**FY 2010-11**

**BACKGROUND INFORMATION**

Thirty-three research proposals requesting a total of \$2,503,433 for the first year of work were submitted for funding consideration during fiscal year (FY) 2010-11 in the Industrial Ties Research Subprogram (ITRS) component of the Board of Regents Support Fund (BORSF). Of the thirty-three proposals submitted, three 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-three 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 six subject areas: agriculture, aquaculture, and animal science; biotechnology and health care; chemical materials and petroleum engineering; computer and information sciences; mechanical and materials engineering; and environmental science & technology and urban development. Each subject area mail 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 reviewed 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 in Baton Rouge on February 10-11, 2011, to discuss Phase I and II subject area evaluations, prioritize awards, and develop funding recommendations. The final panel considered each of the thirty-three 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 \$585,000 would be available in first-year funds for new research projects in the ITRS in FY 2010-11, and that money to continue the second 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, eight proposals were recommended for funding. These eight 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 (Phase III) consensus evaluation, taking into account the economic potential of each project.

Four 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**. Each applicant whose proposal is listed in Appendix B should closely review the reviewers' 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 numerical order in Appendix B, should not be funded this year. The Board of Regents Support Fund 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).

Nine 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 eight 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 eight 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 eight 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 2011.

## **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 2010-11 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. 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 proposals 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 or plan of action:

1. A one-page summary describing the research in layman's language and assessing its technology transfer potential;
2. An assessment of the supportive science and interdisciplinary expertise needed to enhance the potential success of the research, including joint research activities with other researchers or research groups at the same or other institutions;

3. A description of industrial participation representing a 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 proposal 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 obtaining industry and non-academic support as well as development of 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, 2011, for the required first-year matching commitment; by March 31, 2012, for the required second-year match; and by March 31, 2013, for the required third-year matching commitment. The staff of the 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 of the Board of Regents Support Fund.
4. Notify applicants that the industrial support obtained should be incorporated in 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 with their proposals.

## APPENDIX A

ITRS PROPOSALS HIGHLY RECOMMENDED FOR FUNDING  
(PRIORITY ONE)

Rank	Proposal No.	Institution	Recommended BORSF 1 <sup>st</sup> Year Funds	Recommended BORSF 2 <sup>nd</sup> Year Funds	Recommended BORSF 3 <sup>rd</sup> Year Funds
1	033B	UNO	\$ 54,000	\$ 52,000	\$ -----
1	004B	LSU-AG	82,000	76,000	77,000
1	014B	LSU-BR	80,000	79,000	-----
1	011B	LSU-BR	80,000	78,000	-----
5	026B	TULANE	70,000	70,000	70,000
6	029B	ULL	60,000	60,000	60,000
7	008B	LSU-BR	70,000	70,000	-----
8	023B	MCNEESE	<u>70,000</u>	<u>70,000</u>	<u>-----</u>
<b>TOTAL</b>			<b>\$ 566,000</b>	<b>\$ 555,000</b>	<b>\$ 207,000</b>

## APPENDIX B\*

MERITORIOUS ITRS PROPOSALS RANKED PRIORITY ONE BY THE SUBJECT AREA PANELS AND  
CONSIDERED BY THE FINAL PANEL BUT NOT RECOMMENDED FOR FUNDING (4)

002B  
015B  
019B  
031B

**Note:** \*These proposals are not listed in rank order of merit. The panel's comments on these proposals are provided in **Appendix C.3**. Subject Area panel reviews for each proposal will also be provided to the applicants in July 2011.

**APPENDIX C  
MERITORIOUS ITRS PROPOSALS OF LOWER PRIORITIES**

**PRIORITY TWO\***

001B 016B  
003B 021B  
006B 027B  
010B 028B  
032B

**PRIORITY THREE\***

005B 018B  
007B 020B  
009B 022B  
012B 024B  
013B 025B  
017B 030B

*Note:* \*These proposals are not listed in rank order of merit and are not recommended for funding as currently 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 applicants in July 2011.

## 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, 2011, 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, 2012, 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, 2013, 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 provided 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 033B****Rank: 1**TITLE: *Fabrication of Supercapacitors Through Three Dimensional Nanoarchitectures*

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Weilie Zhou, Ph.D.

**Comments:** In 2007, the Energy Independence and Security Act passed in the US aimed at moving the country toward greater energy independence and security by increasing the production of clean renewable fuels, promoting research on renewable energy capture and storage, and improving energy performance and efficiency. Also, in 2009 the United Nations Climate Change Conference pointed out that a significant reduction of carbon monoxide emissions caused by large consumption of fossil fuels by human beings is necessary to protect our climate from further change. Therefore, seeking renewable and clean energy becomes an urgent task for the entire world.

The proposed research is a collaborative effort between UNO Advanced Materials Research Institute (AMRI) and Cleco Power, LLC in Louisiana. The primary objective is to develop supercapacitors (3-dimensional nanoarchitectures) based on nanostructured nanomaterials for complementary energy storage application, i.e. batteries and fuel cells. The research will consist of three parts: (1) vertical nanotube/nanowire array synthesis and characterization; (2) superconductor prototype fabrication and testing; and (3) technology transfer and marketing. Although this is basic research that is of high risk, if successful it will provide a high payoff. The research team is extremely well qualified and the AMRI is an ideal environment for this work. Cleco Power pledges \$5,000 cash support for year 1 of the project in addition to expertise and technical advice. However, there is no pledge support for the remainder of the project which at a minimum should be equal to or greater than year 1. An updated letter confirming Cleco's year 2 commitment must be obtained prior to funding. Funding is recommended at a level of \$54,000 for year 1, \$52,000 for year 2, and zero funding in year 3. The commercialization efforts described in year 3 cannot be accomplished for the amount of funds requested (\$51,796) and should therefore be disallowed. There is considerable interest in supercapacitor technology by the US military and the PI is encouraged to pursue this as a source of potential funding. The PI is required to maintain support for one graduate research assistant (GRA) 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 in full. Funding is contingent upon receipt by the Board no later than June 30, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$54,000	\$5,000 as specified in the proposal
2 <sup>nd</sup> Year	\$52,000	\$5,000 minimum as specified in the proposal/consultants

## Appendix C.2 (continued)

**Proposal 004B****Rank: 1**TITLE: *Cost-effective Cell Harvesting: The Primary Challenge for Microalgal Biofuels*

INSTITUTION: Louisiana State University-Agricultural Center

PRINCIPAL INVESTIGATORS: Chandra S. Theegala, Ph.D.

COMMENTS: According to estimates, microalgae would only require a total of 5% of existing US crop acreage to meet 100% of present transportation fuel needs, compared to corn and soybean that would require crop acreage of 1700% and 650%, respectively. However, several limitations exist in cost-effective mass production of microalgal lipids. One of the most challenging tasks in the production of biofuels from microalgae is cost-effective harvesting of microalgae from liquid cultures. Different harvesting techniques, such as centrifugation and chemical flocculation, have been investigated. Despite their varied effectiveness in separating unicellular cells from small volume cultures or for high value nutraceutical applications, presently there is no viable technique for cost-effectively harvesting microalgal cells from thousands of acres.

Researchers at LSU AgCenter will explore the use of a 2-stage technique for harvesting microalgae from liquid cultures in an effort to overcome the barrier of associated high cost. The first stage is aimed at concentrating low density cultures (~0.02% solids) by a 100 fold (to ~2% solids) using techniques that require ultra low energy and chemicals. Various Stage-1 technologies will be evaluated and the best Stage-1 technology will be integrated with an energy efficient centrifuge (Stage-2) and optimized in the laboratory prior to field testing. The scientific approach is very innovative but it is difficult to judge its potential for success based on the procedures described and the lack of preliminary data. Nevertheless, the proposal is very well written and the research approach appears to be very sound.

The research team is well trained to effectively pursue this economically important area of research. It should be noted that Dr. Theegala lists many funded grants that may well overlap with this proposal. Industrial Partner Aquatic Energy of Lake Charles, LA pledges \$15,000/year in unspecified in-kind services such as facilities usage fees. Prior to funding, an updated letter of support from Aquatic Energy must be obtained detailing their in-kind support. Funding is recommended at a level of \$82,000 for year 1, \$76,000 for year 2, and \$77,000 for year 3. The PI is required to maintain support for one graduate research assistant (GRA) at the level proposed in the original budget in all three years 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 in full. Funding is contingent upon receipt by the Board no later than June 30, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$82,000	\$15,000 as specified in the proposal
2 <sup>nd</sup> Year	\$76,000	\$15,000 as specified in the proposal
3 <sup>rd</sup> Year	\$77,000	\$15,000 as specified in the proposal

Appendix C.2 (continued)

**Proposal 014B****Rank: 1**

TITLE: *Development of Machines and Protocols for the Manufacturing of Novel Microchannel Heat Exchangers for Electronic Cooling of Next-Generation Computers*

INSTITUTION: Louisiana State University – Baton Rouge

PRINCIPAL INVESTIGATOR: Glenn B. Sinclair, Ph.D.

COMMENTS: Computing power has increased dramatically over the past half century. With the increase in computing power comes an equally dramatic increase in the heat generated at the module level. The heat generated by microelectronic chips need to be removed to ensure reliable operations below a maximum allowable temperature. At present, the prevailing technology for heat removal combines all-metal, multiple-fin heat sinks with forced-air convection cooling. It is generally accepted that conventional solid heat sink/forced air cooling will be insufficient for higher performance chips or higher power devices. Chip makers have already attempted to sidestep this chip-level heat dissipation problem by going to multiple processors, each of which generates less heat. The “multi-core” approach postpones the heat dissipation problem temporarily, but shortcomings/disadvantages associated with current cooling strategies remain.

Liquid-passing microchannel heat exchangers are a good idea in principle, because they have a high surface-to-volume ratio and can thus be effective in transferring heat convectively from the solid to liquid flowing within the microchannels. The proposed project focuses on developing machines and protocols for the manufacturing of metal-based, compact microchannel heat exchangers (MHEs) for cooling of microelectronic modules (chips) for the next generation of desktop computers. Researchers at LSU Mechanical Engineering and Enervana Technologies, a start-up company located in Baton Rouge, LA, have demonstrated the feasibility of using metallic MHEs for chip cooling in desktop computers. This R&D has resulted in a patented process for making liquid-passing metallic MHEs that are low in profile, leak-proof, and with high structural integrity. The immediate goal of this research is to develop a cost-effective roll forming process for manufacturing metallic microchannel structures and a bonding process for making them into enclosed microchannel heat exchangers with high reliability.

MHE fabrication appears to be a well established program at LSU-BR. The PIs are extremely well qualified and the innovative nature of their previous work stands out clearly in this proposal. The challenge, however, will lie in the translation of this new technology into an economic and reliable manufacturing sequence. Sound engineering advice from within the institution will thus be necessary. The substantial in-cash support (\$20,000/yr) from industry partner Enervana strengthens this research’s chances for success. It should be noted that the research group also submitted an equally strong proposal on bearing design. The budget appears appropriate for the proposed work and it is recommended that the project be funded at the level requested for year 1 and year 2, i.e. \$80,000 and \$79,000 respectively. The PI is required to maintain support for one graduate research assistant (GRA) 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 in full. Funding is contingent upon receipt by the Board no later than June 30, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$80,000	\$20,000 as specified in the proposal
2 <sup>nd</sup> Year	\$79,000	\$20,000 as specified in the proposal

## Appendix C.2 (continued)

**Proposal 011B****Rank: 1**

TITLE: *New Microscale Thermal Management Technologies for High-Performance, Near Lubricant-Free, Roller Bearings*

INSTITUTION: Louisiana State University – Baton Rouge

PRINCIPAL INVESTIGATOR: Wen J. Meng, Ph.D.

COMMENTS: Growth in aircraft manufacturing has been very strong in recent years, and forecasts suggest that this growth trend will continue. Commercial programs include the development of long-rang, wide-body aircrafts in addition to the increasing production of regional aircraft. The propulsion system of these aircraft typically has two or three rotating shafts in order to meet the aerodynamic requirements of the engine. The bearings that support these shafts are subjected to very demanding operating conditions such as axial loads.

Researchers at LSU-BR Mechanical Engineering and Timken Co. of Canton, Ohio will focus on developing new microscale thermal management technologies for next-generation, high performance rolling element bearings. More specifically, the research will utilize metal-based microchannel heat exchangers (MHEs) incorporated into the bearing system, to remove heat generated from bearing operations, especially under high load/high stress and other mechanically demanding conditions.

This is a well written proposal with clearly stated goals and objectives and is reasonable in scope. This proposal also demonstrates an innovative application of a newly emerging technology, i.e. advanced research in fabrication coupled with application of the concept to bearing design. Timken is an industry leader in developing friction management and power transmission technologies and therefore considered a strong industrial partner and well suited for this work. The substantial pledged support (\$25,000/yr cash and \$25,000/yr in-kind) further strengthens this proposal. Chances of success for the immediate goals seem high, although a significant amount of work could remain to take the concept to useable production-scale devices. The PI is extremely well qualified to carry out the proposed work plan and has a good track record of funding. Additionally, he has established a record of leveraging intellectual property rights that has proven beneficial to the university as well as the industry partner. The budget appears appropriate for the work proposed and the project should therefore be funded at the level requested, i.e. \$80,000 for year 1 and \$78,000 for year 2. The PI is required to maintain support for one graduate research assistant (GRA) 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 in full. Funding is contingent upon receipt by the Board no later than June 30, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$80,000	\$50,000 as specified in the proposal
2 <sup>nd</sup> Year	\$78,000	\$50,000 as specified in the proposal

## Appendix C.2 (continued)

**Proposal: 026B****Rank: 5**

TITLE: *Novel Multifunctional Materials for the Environmental Remediation of Chlorinated Hydrocarbons*

INSTITUTION: Tulane University

PRINCIPAL INVESTIGATORS: Vijay T. John, Ph.D.

COMMENTS: The proposed research will focus on the design of multifunctional particles that are effective in the remediation of chlorinated hydrocarbons such as Trichloroethene (TCE). These hydrocarbons form a class of dense non-aqueous phase liquid (DNAPL) contaminants in groundwater and soil that are difficult to remediate. They have a density greater than water and settle deep into the sediment from which they gradually leach out into aquifers causing long-term environmental pollution. The PI will use easily synthesized carbon microspheres, prepared from inexpensive precursors such as common sugars and polysaccharides through an aerosol process. These microspheres are sized for optimal transport and designed to host zerovalent iron nanoparticles. The PIs will study the adsorption, reaction, transport and interfacial partitioning relevant to the problem of TCE remediation.

This proposal appears similar to a previous ITRS submission; however, with much more detail. Three industry collaborators are identified for this project, although only two are considered industrial partners, i.e. NanoFex, New Orleans, LA (\$116,666.67 in-kind), a start-up company formed to commercialize the technology and provide expertise to allow progression of the technology, and Columbian Chemicals, Marietta, GA (\$75,000 in-kind), a large carbon-black manufacturer. MECX, Houston, TX, pledges no support but agrees to provide guidance and help in identifying and establishing clients to help transition the technology from the laboratory scale to field test and commercial availability. This remediation company will act solely through Nanoflex and thus cannot be seen as an industry partner. Also, the research appears similar to a previously funded NSF project and there is concern regarding potential overlap. Nevertheless, the investigators are well qualified to carry out the proposed work plan. Funding is recommended at a level of \$70,000 for year 1, \$70,000 for year 2, and \$70,000 for year 3. The PI is required to maintain support for one graduate research assistant (GRA) at the level proposed in the original budget in all three years 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, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$70,000	\$63,888 as specified in the proposal
2 <sup>nd</sup> Year	\$70,000	\$63,888 as specified in the proposal
3 <sup>rd</sup> Year	\$70,000	\$63,888 as specified in the proposal

Appendix C.2 (continued)

**Proposal 029B****Rank: 6**TITLE: *Modular Sediment Retention and Shoreline Protection Structures*

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATORS: Donald F. Hayes, Ph.D.

COMMENTS: The conversion of wetlands and uplands to open water habitat in coastal Louisiana is an issue of major national significance. This conversion has many causes that are interrelated, but one of the major causes is shoreline erosion along open water bodies (bays and estuaries) and waterways (bayous, rivers, canals, and navigation channels). Numerous structures have been proposed and used in an attempt to reduce shoreline erosion, but they have met with limited success. Conventional shoreline protective structures (e.g., terraces, sediment fences, breakwaters, riprap) are expensive to construct in these environments and may impede environmental exchanges that are essential for connectivity and functionality.

The primary goal of this project is to test the viability of a Wave Suppressor Sediment Collection (WSSC) system designed by Pierce Industries, Cutoff, LA. ULL researchers will work to optimize the design, evaluate its potential application for specific coastal problems, and gather data to support implementation. Although the proposed research addresses the important problem of shoreline erosion, more discussion of the fundamental hypotheses, mechanism, or underlying theory of suppressor sediment collection should have been provided. Nevertheless, the metrics used in the evaluation of the WSSC system are clear and the research team qualified to carry out the proposed work plan. The proposed budget should be revised to eliminate the cost of the WSSC prototype and to provide support for only one graduate research assistant (GRA) in lieu of two GRAs. Funding is recommended at a level \$60,000 for year 1, \$60,000 for year 2, and \$60,000 for year 3. ITRS funds should not be used for the purpose of building the WSSC prototype when clearly this should be funded by the industry partner and the need for two GRAs was not well justified. The PI is required to maintain support for one GRA at the level proposed in the original budget in all three years 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, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$60,000	\$15,000 as specified in the proposal
2 <sup>nd</sup> Year	\$60,000	\$15,000 as specified in the proposal
3 <sup>rd</sup> Year	\$60,000	\$15,000 as specified in the proposal

Appendix C.2 (continued)

**Proposal 008B****Rank: 7**

TITLE: *Alternative Techniques for Hydraulic Fracturing Monitoring to Maximize Safe Recovery of Shale Gas Resources*

INSTITUTION: Louisiana State University – Baton Rouge

PRINCIPAL INVESTIGATOR: Taleghani Dahi, Ph.D.

COMMENTS: According to the Department of Energy (DoE), it is projected that shale gas will comprise over 20% of the total US gas supply by 2020. At the present time, hydraulic fracturing is extensively used to improve oil and gas well productivity in addition to geothermal energy extraction and hazardous solid waste disposal. It is widely understood that hydraulic fracture treatments take place predominantly under conditions of pure tension. In contrast, the standard approach of microseismic monitoring locates induced shear events away from the actual tension fracture and the true tension events are expected to generate lower frequency content (less than 5HZ) than standard monitoring sensors can detect (>10HZ). In addition the US Environmental Protection Agency (EPA) is currently reviewing the potential hazard of fluids used during hydraulic fracturing to contaminate the environment. Fracturing fluids may contain kerosene, benzene, toluene, xylene, and formaldehyde.

Researchers at LSU-BR and Schlumberger of Addison, TX will focus on improving the accuracy in locating hydraulic fractures. New software will be developed to identify true hydraulic tension fractures via the expected spatial and temporal amplitude radiation patterns of compression and shear waves. Results should improve upon current techniques for estimating the tensile fracture location, shape and extension by employing improved full moment tensor techniques. This is a well written proposal with clearly defined goals and objectives. It is a sound approach addressing an important topic. The work plan is quite detailed but could be more problematic in reality. Nevertheless, the improvement potentially available through better modeling could reduce the cost and environmental concerns associated with hydro fracturing. Schlumberger is an excellent industry partner and their pledged in-kind support of \$20,000/yr is encouraging. It is presumed that others are pursuing the same goals with very large research efforts. There are some questions regarding the role of Mr. Joel Le Calvez, lead principal Geologist at Schlumberger to the research that should be answered. The proposed budget should be reduced to provide support for one graduate research assistant (GRA) in lieu of two, limit supplies to \$13,000, and travel to \$3,000/year. Funding is recommended at a level of \$70,000 for year 1, and \$70,000 for year 2. The PI is required to maintain support for one GRA 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 in full. Funding is contingent upon receipt by the Board no later than June 30, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$70,000	\$20,000 as specified in the proposal
2 <sup>nd</sup> Year	\$70,000	\$20,000 as specified in the proposal

## Appendix C.2 (continued)

**Proposal 023B****Rank: 8**

TITLE: *A Comprehensive Hydrodynamic and Sediment Study for Calcasieu Ship Channel and Surrounding Water Systems*

INSTITUTION: McNeese State University

PRINCIPAL INVESTIGATOR: Ning Zhang, Ph.D.

COMMENTS: Calcasieu Ship Channel connects the port of Lake Charles to the Gulf. It is very important to the area industry and economy. The ship channel was designed about 40ft deep for safe navigation. However, the bottom of the ship channel is covered by unwanted sediments, and requires dredging annually. About 4 million cubic yards of sediments are removed every two years, and cost the government millions of dollars. The goal of this project is to develop a numerical model to simulate sediment transport in the Calcasieu Ship Channel and surrounding area and to identify the sources of its excessive sediments. There are four possible sources: (1) the upstream input from rivers and waterways, (2) the downstream Gulf of Mexico, (3) bank erosion, and (4) the land loss from surrounding wetlands.

Although the proposed research does not appear particularly innovative and the goals are very narrowly focused, the rationale for the project clearly expresses the need for a solution to the annual dredging of the Calcasieu Ship Channel. The PI appears to have a strong relationship with the industry partners, but it is unclear how this technology transfer will actually take place. Nevertheless, the PI is experienced in numerical modeling and if successful could be of great benefit to Louisiana. Industrial partners (LA Ash, Sulphur, LA and Lonnie G. Harper and Associates, Grand Chenier, LA) provide modest in-kind contributions of \$5,450/yr and \$5,000/yr, respectively. The proposed budget appears excessive and should be revised to provide support for one graduate research assistant (GRA) in lieu of three, limit travel to \$3,000/year and move the cost of software to the supplies category. Funding is recommended at a level of \$70,000 for year 1, and \$70,000 for year 2. The research plan did not define a need for three GRAs. The PI is required to maintain support for one GRA 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 in full. Funding is contingent upon receipt by the Board no later than June 30, 2011 of updated documentation showing support at the levels indicated in the original proposal and as required in Appendix C.1.**

BUDGET	BORSF	EXTERNAL
1 <sup>st</sup> Year	\$70,000	\$10,450 as specified in the proposal
2 <sup>nd</sup> Year	\$70,000	\$10,450 as specified in the proposal

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

Note: These proposals are not listed in rank order of merit.

**Proposal 002B**

TITLE: *Complete Recycling of Chromated Copper Arsenate (CCA)-treated Wood to Industrial Raw Materials and Biodegradable Foam Insulation*

INSTITUTION: Louisiana State University-Agricultural Center

PRINCIPAL INVESTIGATORS: Hui Pan, Ph.D.

COMMENTS: Chromated copper arsenate (CCA) once was the most popular waterborne wood preservative in the world due to its excellent preservation performance and low price. With an expected average service life of 20-40 years, the amount of spent CCA-treated wood will expand greatly from current estimates of 3-4 trillion m<sup>3</sup>/yr to around 12 million m<sup>3</sup>/yr in the US and Canada within the next 15 years. Landfilling, the traditional disposal method for CCA-treated wood waste, has raised lots of concerns regarding both the environmental contamination and human health issues raised by the heavy metals. Consequently, landfill tipping fees continue to increase and the regulatory requirements are more restrictive, which collectively makes the landfill option more impractical. The proposed research will focus on developing a recycling method for spent CCA-treated wood waste that can reclaim both the heavy metals and the metal-free wood. More specifically, the research uses a liquefaction-precipitation process to separate toxic heavy metals from CCA-treated waste for reuse as a heavy metal industrial raw material and CCA-free liquefied wood as polyols to develop bio-degradable polyurethane foam which can be used in “green” insulation materials.

This proposal is similar to a prior year submission which was not recommended for funding. It appears that the PI did not address the panel’s previous comments and therefore the panel’s recommendation remains unchanged. The research proposes that CCA-free wood will be used to develop biodegradable polyurethane foam green insulation. It is important to determine if insulating foams produced from the stripped wood will have low enough levels of residual metals to be used in green insulation products. The process uses large amounts of organic solvents and potentially acidic catalysts and produces large amounts of toxic metals that may, or may not, be reused in wood treatment. It is difficult to conceive of the process being either economically or environmentally desirable.

Appendix C.3 (continued)

**Proposal 015B**

TITLE: *Unconventional Hydraulic Control for Deep-Aquifer Saltwater Intrusion Mitigation Under Uncertainty*

INSTITUTION: Louisiana State University – Baton Rouge

PRINCIPAL INVESTIGATORS: Frank T. Tsai, Ph.D.

COMMENTS: Due to excessive groundwater withdrawal, many Louisiana freshwater aquifers are being contaminated by saltwater intrusion. The major aquifer systems affected include the Chicot aquifer system of southwestern Louisiana, the Sparta aquifer system of northern Louisiana, and the Southern Hills aquifer system in the Baton Rouge Capital area and surrounding parishes. The project goal is to conduct a pilot study that develops a saltwater intrusion management model by utilizing an unconventional hydraulic control to mitigate saltwater encroachment. The unconventional hydraulic control consists of: (a) horizontal wells in individual aquifers; and (b) slant-hole wells across a sequence of aquifers. The wells can act as extraction wells to pump out saltwater at multiple locations or inject freshwater to form hydraulic barriers. A hierarchical Bayesian model averaging (HBMA) method will be developed to identify and quantify various sources of uncertainty in the management model.

The societal justification for salt-water remediation is compelling, but it is not clear that a simulation model is needed other than to direct company investments. There is no explanation regarding how this work will be used in the future or what other industries would be interested. The PI has a large NSF grant pending in this area and there is concern about potential overlap. Additionally, the PI has a current Baton Rouge Water Works Company (BRWWC) grant in this area as well as many other grants. BRWWC provides no additional support for this project.

## Appendix C.3 (continued)

**Proposal 019B**

TITLE: *Development of a Novel Drug Eluting Stent with Improved Efficacy, Safety and Biocompatibility*

INSTITUTION: Louisiana State University Health Sciences Center-Shreveport

PRINCIPAL INVESTIGATORS: Tammy Dugas, Ph.D.

COMMENTS: Drug-eluting stents (DES) are commonly used to open arterial obstructions that restrict blood flow to cardiac tissue. Stents consists of a metal scaffold coated with a polymer that elutes a drug to prevent the renarrowing of the vessel caused by vascular smooth muscle cell proliferation. Current generation stents release compounds that are toxic to endothelial cells and thus delay the vascular healing process. This increases the risk of major thrombotic events in some individuals.

The proposed research is a continuation of prior work at LSUHSC-Shreveport to develop drug-eluting stents (DES) that use a polymeric coating to elute a drug to inhibit smooth muscle proliferation and luminal narrowing. The researcher has developed coatings which release resveratrol and quercetin (RQ) – plant-derived polyphenols in a combination that is said to be non-toxic to endothelial cells and hence promotes rapid healing while still preventing restenosis. The proposal provides exhaustive detail along with excellent preliminary data—some of which is now published. The work proposed appears overly ambitious given the need to develop the stents prior to commencing trials. The stent production must depend on ReQquisite Biomedical, a late start-up company, with research in Shreveport, LA and St. Paul, MN. Dr. John Foley, CEO of ReQquisite Biomedical, has excellent qualifications; however, there is no evidence that he can produce the stents required. If no stents are produced, nothing can be accomplished. Also of concern is that Dr. Foley is now the principal scientist for another company—Synovis, St. Paul, MN, a major manufacturer of implantables. The effect this will have on ReQquisite is unknown. Additionally, the company notes that it has received a \$100,000 startup grant from Lorain County Innovation Fund, Cleveland, Ohio that is dependent on ITRS funding for this project. Their in-kind contribution is valued at \$100,000 for stents. The research connection to Ohio is unexplained and very troubling indeed. Finally, the biomedical use of plant polyphenols remains controversial and the utility of the proposal is based on (what is admittedly impressive) partially published data. To fund a three-year project almost solely based on the ability of a start-up company to produce a device (DES) is risky. This is particularly true given the high budget request.

Appendix C.3 (continued)

**Proposal 031B**

TITLE: *Highly Specific SNP Discrimination via Nanopore Transduction Detection*

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATORS: Stephen N. Winters-Hilt, Ph.D.

COMMENTS: Nanopore transduction detector (NTD)-based single nucleotide polymorphism (SNP) detection offers an interesting prospect for medical diagnostics and cancer screening by assaying targeted regions of genomic variation. Common methods of single nucleotide polymorphism (SNP) detection are typically polymerase chain reaction (PCR) based, thus inherit the PCR error rate (0.1% in some situations). The percentages of minority SNP population might be 0.1%, or less in instances of clinical interest. The primary objective of this research is to demonstrate highly sensitive, discriminative, biosensing capability using a nanopore transduction detector (NTD).

The proposed research suggests that a nanopore transduction detector (NTD) would be useful for pathogen detection as a direct DNA-based system which would not require PCR amplification. Additionally, it suggests the use in SNP detection and claims higher specificity and sensitivity than current methods, in addition to advantages in speed and cost. In general high sensitivity is not a requisite for SNP detection and PCR would afford the ultimate in sensitivity for pathogen detection, being an amplification-based technique. Since the technique suggested is not single molecule-based (but rather an ensemble technique requiring sophisticated data analysis and electronics) it is difficult to see the utility for the intended application. It would not have the ultimate sensitivity of PCR and little added advantage for SNP detection. Perhaps more critical, but difficult to discern from the proposal is the proposed use of an alpha-hemolysin biopore in an artificial bilayer. Such nanopore devices are notoriously unstable because of problems with lipid bilayer stability. Hence, the advantage of the biopore lies in its ease of generation in a laboratory setting but it is very likely unsuitable for a commercial device as described. Commercial biopore systems using different designs are already well advanced for single molecule reading. As is noted, care must be taken in the design of hairpin structures to translate through and/or be captured by the transduction detection system. Dr. Winters-Hilt is a computer scientist with experience in signal processing algorithm development but no evident experience in nanotechnology, and appears to be dependent on a number of out-of-state collaborators for his work. The proposal is extremely difficult to read and it is hard to discern hypothetical from obtained data. It fails to clearly define the synthesis of what is presumed to be a biopore in an artificial membrane. The antibody-based work is totally discursive and does nothing to advance the proposal but seems in some way to be related to PxBiosciences corporate interests. A rewritten, focused proposal demonstrating the potential of the proposed system should be more successful in the next competition.

**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 listed in Priority One. Individual subject area commentaries on proposals ranked Priority II are not included in this report. Proposals so ranked were not recommended for funding or recommended only if additional money becomes available.

**Proposal 001B**

**TITLE:** *Production of Physiologically Functional Oligosaccharides including Anti-fungal Properties and Nutraceuticals*

**INSTITUTION:** Louisiana State University – Agricultural Center

**PRINCIPAL INVESTIGATORS:** Misook Kim, Ph.D.

**COMMENTS:** Oligosaccharides are widely used in food, feed, pharmaceutical, and cosmetic industries for their beneficial health effects for human and animals. Oligosaccharides are simple carbohydrate molecules linked together in short chains. Hundreds of combinations are possible and different combinations of sugar molecules have different physiological functions when they interact with living organisms. Commercially available oligosaccharides are currently limited to fructo-oligosaccharides and galacto-oligosaccharides. They are produced and marketed for prebiotic food ingredients. These prebiotic oligosaccharides are consumed by non-pathogenic beneficial enteric bacteria allowing them to compete with pathogenic bacteria for dominance in intestinal populations. These beneficial bacteria then produce butyrate and other short-chain fatty acids that may act as post-biotics.

Some of the oligosaccharides developed at LSU AgCenter's Audubon Sugar Institute show promise for antifungal properties and as a potential human milk oligosaccharide substitute. The basis of this relatively modest two-year proposal is to scale up production using Dextranucrase from *Leuconostoc mesenteroides* in large reactor systems, and to evaluate cellobio-oligosaccharides (CBOs) as agricultural fungicides. The isomalto-oligosaccharides (IMOs) are said to be potential mimics of the probiotic properties of human milk and will be investigated for their ability to support the growth of desirable intestinal microorganisms. Although development of CBOs as an agricultural fungicide shows some promising preliminary data, there are strong economic concerns. The proposal lacked details for the critical proposed scale-up production and included no economic analysis on cost. The economic viability of the project depends, in part, on the cost and availability of maltose and cellobiose which are transglycosylated to the sucrose as well as the cost/ease of the enzymatic production. In addition, the end product purification is not trivial and simulated moving bed chromatography is suggested as a method to be investigated for this purpose. Nutraceutical utility as presented in Table 2 (in broiler chickens) was less impressive and this aspect of the investigation would seem to be beyond the scope of this proposal, although it is the source of industrial interest. Dr. Misook Kim is a junior investigator with a reasonable publication record in the area and Dr. Donal Day is an endowed professor. Both investigators have modest funding through July 2011 with several proposals pending.

Appendix C.4 (continued)

**Proposal 003B**

TITLE: *Effects of Diet on Growth of Farm-Raised American Alligator and Air/Water Quality of the Production Environment*

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATORS: Robert C. Reigh, Ph.D.

COMMENTS: Rapid animal growth and the production of quality skins are two essential components of profitable alligator farming. A critical factor affecting these outcomes is proper nutrition. Despite the value of the Louisiana alligator industry (\$32.2 million in 2009) and the impact of nutrition on profitability, little is known of the nutritional needs of the American alligator or optimum conditions for intensive alligator production. The current method of farming alligator involves feeding high-protein diets in heated (32C) houses where levels of ammonia often reach high concentrations. These conditions could negatively affect alligator growth and health.

The proposed research will focus on improving nutrition in Louisiana alligator farming. More specifically, the researchers will investigate the relationship between protein intake and air/water quality to establish best practices. It is believed that low protein diets will still support adequate growth while decreasing ammonia production, resulting in overall lower production costs. Nevertheless, the proposal failed to demonstrate the necessity for lower ammonia production and air/water quality issues. Although this may eventually be significant, relatively minor changes in protein content (56-36%) may not produce a significant decrease. Substituting powdered cellulose filler (not present in the standard diet) for protein may also have effects on nutritional status. The basal diet is a proprietary formula and details of the nutrients cannot be provided. The investigators appear to have limited background in alligator farming/nutrition. Finally, the \$19,500 in equipment cost for a nitrogen analyzer to measure dietary crude protein should be eliminated and measurements outsourced.

Appendix C.4 (continued)

**Proposal 006B**

TITLE: *New Health-promoting Spice Product from the Decommissioned Materials of Tabasco Sauce Processing*

INSTITUTION: Louisiana State University – Agricultural Center

PRINCIPAL INVESTIGATORS: Zhimin Xu, Ph.D.

COMMENTS: With the increasing annual production of Tabasco red pepper sauce, a significant amount of decommissioned raw pepper is generated as well. Selling the raw materials is not cost-effective due to low prices and high shipping cost. Discarding them as waste is not a viable alternative due to environmental concerns. Thus, developing value-added products from the raw materials may be the only viable and profitable solution. Preliminary studies show that the materials richly contain oleoresin essential oils, which also display the characteristic original taste of Tabasco sauce and largely retain the major spicy components, capsaicinoids. The capsaicinoids and carotenoids in the oil have great health-promoting antioxidant function and can reduce the risk of developing various chronic diseases.

The goal of this project is to develop a value-added product derived from decommissioned materials generated in Tabasco sauce (McIlhenny Co, Avery Island, LA) processing. The new product will retain and concentrate the health-promoting components from peppers, such as vitamins C and E, provitamin A, carotenoids, phenolics, and flavinoids. Although this proposal attempts to address agricultural/industrial waste issues which are a real problem, the research proposed is far too narrow in scope for ITRS funding. The measurement of alleged health promoting effects is limited to measuring its ability to prevent fish-oil oxidation. The research neglects to consider that concentrated capsaicinoids are extremely irritating and cause gastrointestinal spasms in many individuals. This is a project that should probably be funded by the industrial partner.

Appendix C.4 (continued)

**Proposal 010B**

TITLE: *Transport of Surface-Modified Magnetic Nanoparticles in Subsurface Environmental Remediation*

INSTITUTION: Louisiana State University – Baton Rouge

PRINCIPAL INVESTIGATOR: Seung I. Kam, Ph.D.

COMMENTS: The concept of using nanoparticles, especially magnetic nanoparticles, has recently been introduced to in-situ subsurface environmental remediation and regarded as a potentially innovative technology to remove or immobilize subsurface contaminants. These nanoparticles are typically surface-engineered with other chemicals such as surfactants and polymers in order to meet certain criteria for improved performance. Many of the characteristics of these surface-engineered nanoparticles are not well understood and their physical/chemical behaviors in the presence of multiple immiscible phases within porous media are yet to be fully explored and examined.

The major objective of this study is to enhance the processes of subsurface environmental remediation by using surface-engineered nanoparticles suspended in the injected fluids of interest. The proposed research will study wettability designs for particle surfaces and examine particle transport in porous media wetted with an aqueous or aqueous oily phase. Particle transport during foam surfactant flow will also be studied. There are however, other obvious issues which must be considered, for example: (1) how will the particles trap and neutralize hazardous material; (2) what will the fate be of the particles in sub-surface locations; and (3) will they degrade and in how much time? Much is already known about the production of magnetic nanoparticles and studies of subsurface transports are only apropos of the material that inactivates the contaminants. Dr. Seung Ihl Kam has a strong background in oil technology and remediation and Dr. Jin-Woo Choi's training is in nanotechnology which is appropriate for this work. Industrial support (Korea Rural Community & Agriculture Corporation Environmental and Remediation Division, South Korea) is provided for a graduate student for each year of the project.

Appendix C.4 (continued)

**Proposal 016B**

TITLE: *Novel Nanomaterials for Medical Diagnostics*

INSTITUTION: Louisiana State University – Baton Rouge

PRINCIPAL INVESTIGATOR: Isiah M. Warner, Ph.D.

COMMENTS: Diagnosis and detection of major diseases such as cancer are formidable problems which require continued simultaneous development of diagnostic instrumentation and diagnostic/treatment reagents. Treatment of cancer is generally done through surgery, radiation therapy, chemotherapy and other less common therapies. However, the success rate for treatment ultimately depends on early detection. In this regard, nanomedicine can be considered to provide great promise for more sensitive and early detection.

The objective of this overall research effort is to develop a novel strategy for imaging normal and diseased tissues, as well as for diagnosis and treatment of cancer. The proposal suggests the use of unique nanoparticles described as a Group of Uniformed Materials Based on Organic Salts (GUMBOS). Dr. Warner has a distinguished record in the design of nanomaterials (although details of nanoparticle production appear absent) which is supported by an excellent list of references and has put together an extensive group of co-investigators and post-docs who appear well qualified. Nevertheless, many of the theoretical arguments seem hard to justify—for example, “We have obtained preliminary data which supports our contention that it is possible to design nanoGUMBOS which are 1) selectively solubility for cancer cells and 2) selectively soluble within a given cell.” The idea of using selective hydrophobicity to target nanoparticles seems hard to support as essentially all proposed cell-specific selective targeting schemes rely on some specific ligand receptor interaction. The long section on fluorescence lifetime imaging (FLM) measurements in cells does not seem apropos to this project nor is it original. Some preliminary data is presented on a trifunctional GUMBOS which is said to have magnetic, luminescent and cancer targeting properties. It is said that a lipophilic phosphonium cation can serve as a mitochondrial targeting agent selective for cancer cells. Claims of specific induction of apoptosis in tumor versus normal tissue culture cells are not strongly supported by the data. The major driver for this proposal is the production of nanomaterials for medical diagnosis. Only one co-principal investigator (Dr. Siat Aggarwal) has a biological research background and the list of publications cited is brief and not appropriate for the proposed work. The proposal does not present a cogent method of procedure for either selecting or testing the GUMBO nanomaterials. This is unfortunate as there is significant promise in the class of materials. Careful rewriting to justify the biomedical utility of the proposal and the addition of an investigator with a background in the field would be a real positive in future competitions.

Appendix C.4 (continued)

**Proposal 021B**

TITLE: *Assessment of Forest Planning Sensitivity to Product Allocation Using Remote Sensing Data*

INSTITUTION: Louisiana Tech University

PRINCIPAL INVESTIGATOR: Bogdan M. Strimbu, Ph.D.

COMMENTS: More than half the State is covered by forests, and especially in rural areas forest-related products and services are the main economic driver. Therefore, the performance of the forestry sector has a significant importance not only at the State level but also at the community level. A crucial element of a successful forestry sector is accurate knowledge of the forest inventory, not only the amount available but also what products can be obtained from the available resources. The inventory provides a momentary description of the magnitude and the possible products that can be obtained from the forest, but it has no connection with economic and social needs.

The proposed research aims to identify the impact of forest inventory attributes commonly determined using remote sensing information on product allocation and , more specifically, to integrate a variety of remote sensing technologies into forest management. This is a very ambitious forestry modeling project with a large budget. The requested software package (Woodstock/Stanley) at \$5,000 should be available to any group with research interests in forestry planning and therefore is not justified. The industrial partner agrees to provide field data as a in-kind match which it would likely produce even absent this proposal as part of management.

Appendix C.4 (continued)

**Proposal 027B**

TITLE: *Methods for Genetic Detection Using Interspersed Genetic Elements*

INSTITUTION: Tulane University Health Sciences Center

PRINCIPAL INVESTIGATOR: David S. Franklin, Ph.D.

COMMENTS: Human Identification (HID) testing has evolved from blood typing and serological analysis to state-of-the-art DNA profiling. In the United States, the federal government has promulgated the current Quality Assurance Standard for Forensic DNA Testing Laboratories and serves as the gatekeeper and controller of databases currently utilized in the US. These databases include Convicted Offender Profiles, Arrestee Profiles, Illegal Immigrant Profiles, and Missing Person Profiles as well as Forensic Evidence Profiles. The US military also collects reference samples from active duty personnel in the event that soldiers' remains need identification via DNA profiling. More specific applications of DNA profiling and database generation include mass disasters such as the attack on the Twin Towers in New York and the 2005 hurricanes on the Gulf Coast; each resulting in the death of many citizens and a need to accurately identify the deceased. Global terrorism has also highlighted a need for additional databases for subsequent identification of victims of terrorist acts.

This project seeks to investigate the use of an already designed multiplex ALU primer system for the genetic identification of humans. Although this proposal was submitted for potential ITRS funding, it appears better suited for SBIR funding consideration. The proposal was highly fragmented and lacked a strong commitment from the industry partner. InnoGenomics, LLC provides modest support (10% cash and 10% in-kind) but presumably will own all of the intellectual property. Unfortunately the research plan was unclear in the work that has been done and what still remains. David Franklin has a very limited CV in general and no publications relevant to the research. Dr. Sinha (industrial partner) has a much more impressive CV directed toward this project and owns a number of potentially overriding patents on the technology. Hence, the role of the Tulane research group is difficult to measure and it is certainly hard to justify the high level of funding for this three-year project. As it is currently written, it is unclear why TUHSC and Dr. Franklin are even involved. Finally, this proposal failed to demonstrate how this project would have a significant impact on Louisiana's economy.

Appendix C.4 (continued)

**Proposal 028B**

TITLE: *Production of Propylene Glycol via Biomass-Based Feedstocks Using Hydrogen-Induced Catalysis*

INSTITUTION: University of Louisiana at Lafayette

PRINCIPAL INVESTIGATOR: Stephen T. Dufreche, Ph.D.

COMMENTS: For the past few years the biodiesel industry has been crippled by an overabundance of glycerol. Although it was once sold as a valuable co-product, it now constitutes a drain on profitability due to greatly decreased market value. UL Lafayette proposes a research partnership with two commercial entities in the conversion of glycerol to 1,2-propanediol, utilizing hydrogen production from biomass gasification. This will convert a waste product into an important precursor for the petrochemical industry. The final product can be used as a feedstock in polymer production, antifreeze, and other compounds. Current catalytic conversion uses heterogeneous catalysts and high partial pressures of hydrogen. This research will focus on the use of crude biodiesel glycerin as well as hydrogen produced through gasification of locally available biomass.

This is a clearly written proposal by a team of well qualified investigators. However, there are many serious questions about the economics of the proposal; for example, crude glycerin is a by-product in biodiesel production (about 1 part in 10). Although overproduction of crude glycerin has led to its being considered waste, the future is hard to predict. Biodiesel production depends on government subsidies which may or may not continue. The relationship with Terra BioChem is impressive, since it represents a real collaboration to solve the problems related to commercial production. The interaction with Cleco Power and the use of a research-grade biomass gasifier are also real strengths. A careful economic analysis would much improve this proposal submission.

Appendix C.4 (continued)

**Proposal 032B**

TITLE: *Holographic HMMs and Stochastic Carrier Wave Communications*

INSTITUTION: University of New Orleans

PRINCIPAL INVESTIGATOR: Stephen N. Winters-Hilt, Ph.D.

COMMENTS: Hidden Markov models (HMM) are used in speech recognition and bioinformatics and have an extensive, and growing breadth of applications in other areas—especially as more computational resources become available. Other areas of HMM application include gesture recognition, handwriting and text recognition, image processing, computer vision, communication, climatology, and acoustics. HMMs are a central method in all of these approaches because they are the simplest, most efficient modeling approach when combined with a Bayesian statistical foundation for Markovian stochastic sequential analysis with the efficient dynamic programming table constructions possible on a computer.

The goal of this research is to explore stochastic carrier wave (SCW) communications in the nanopore detector setting, where signal sources will be engineered to make use of an anomalous duration distribution ‘tag’—a duration distribution engineered to have a significant tail or a second peak. This proposal is related to and in part dependent on another proposal submission by the PI in the biotechnology area. As noted previously, the biological nanopore-based system which it is believed the PI intends to use is unsuitable for commercial development, although of interest in basic research applications. The letters from Meta Logos, Mandeville, LA, and PxBiosciences, New Orleans, LA, promise nothing; in fact the PxBiosciences letter specifically states it is to “memorialize our agreement.” It is unclear if this is an in-kind contribution. It appears that the one year of support is for PxBiosciences to hire their own consultants. Finally, it should be noted that there is no evidence that Dr. Winters-Hilt has a wet lab at UNO or any facilities to obtain nanopore data. Clarification of these issues and careful rewriting of the proposal to increase clarity and demonstrate utility would greatly improve this proposal’s competitiveness in future competitions.

## APPENDIX C.5

### GENERAL STATEMENT ON PROPOSALS RANKED PRIORITY III BY THE FINAL PANEL

Individual commentaries on proposals ranked Priority III 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
- Proposals did not have clear objectives and/or research plans lacked scientific rigor or completeness
- The background of a 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 inappropriate for the research proposed

**APPENDIX D**

**LIST OF SUBJECT AREA REVIEWERS WHO PARTICIPATED  
IN PHASES I & II OF THE REVIEW PROCESS**

**Agriculture, Aquaculture, and Animal Science**

**Dr. Duane L. Johnson, Chair**  
Great Plains Oil and Exploration Company  
Camelina Company

**Dr. Paul Raymer**  
Department of Crop and Soil Sciences  
University of Georgia

**Biotechnology and Health Care**

**Dr. Radu Marches, Chair**  
Cancer Immunobiology Center  
University of Texas Southwestern Medical Center at Dallas

**Dr. Leo Herbette**  
President, Exploria

**Chemical Materials and Petroleum Engineering**

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

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

**Computer and Information Sciences**

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

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

Appendix D (continued)

**Mechanical and Materials Engineering**

**Dr. John Berry, Chair**

E. P. Coleman Professor, Department of Mechanical Engineering  
Mississippi State University

**Dr. Mathew Schaefer**

Department of Mechanical and Industrial Engineering  
Milwaukee School of Engineering

**Environmental Science & Technology, and Urban Design**

**Dr. Treavor H. Boyer, Chair**

Department of Environmental Engineering Sciences  
University of Florida

**Dr. Jennifer Webber Edmonds**

Department of Biological Sciences  
University of Alabama

**APPENDIX E**

**SUMMARY OF PROPOSALS SUBMITTED TO THE  
INDUSTRIAL TIES RESEARCH SUBPROGRAM (ITRS)  
FY 2010-11**

Proposals Submitted to the Research and Development Program - ITRS  
for the FY 2010-11 Review Cycle

Proposal #	PI Name	Discipline	Institution	Project Title	Amount Requested				Confidential Info
					Year 1	Year 2	Year 3	Total	
001B-11	Kim,Misook	Scientific	A&M College - Agricultural	Oligosaccharides including Anti-fungal Properties and Complete Recycling of Chromated Copper Arsenate (CCA)-treated Wood to Industrial Raw Materials and Bio-Degradable Foam Insulation	\$80,000	\$75,000	\$0	\$155,000	No
002B-11	Pan,Hui	Scientific	Louisiana State University And A&M College - Agricultural Center	Effects of Diet on Growth of Farm-Raised American Alligator and Air/Water Quality of the Production Environment	\$64,100	\$63,100	\$63,600	\$190,800	No
003B-11	Reigh,Robert	Scientific	Louisiana State University And A&M College - Agricultural Center	Cost-effective Cell Harvesting: The Primary Challenge for Microalgal Biofuels	\$70,273	\$50,773	\$0	\$121,046	No
004B-11	Theegala,Chandra	Scientific	Louisiana State University And A&M College - Agricultural Center	Characterization of flooding-induced molecular, morphological, and pathogenic responses in sweetpotatoes	\$82,774	\$76,165	\$77,378	\$236,317	No
005B-11	Villordon,Arthur	Scientific	Louisiana State University And A&M College - Agricultural Center	New health-promoting spice product from the decommissioned materials of Tabasco sauce processing	\$75,000	\$70,000	\$60,000	\$205,000	Yes
006B-11	Xu,Zhimin	Scientific	Louisiana State University And A&M College - Agricultural Center	A Methodology to Improve Efficiency of Construction Workers.	\$50,000	\$50,000	\$0	\$100,000	No
007B-11	Aghazadeh,Fereydoun	Scientific	Louisiana State University And A&M College - Baton Rouge	Alternative Techniques for hydraulic fracturing Monitoring to Maximize Safe Recovery of Shale Gas Resources	\$43,568	\$0	\$0	\$43,568	No
008B-11	Dahi Taleghani,Arash	Scientific	Louisiana State University And A&M College - Baton Rouge	Use of Oxygen Release Compound (ORC) on the Recovery of Oil Impacted Wetlands	\$108,389	\$100,000	\$0	\$208,389	No
009B-11	DeLaune,Ronald	Scientific	Louisiana State University And A&M College - Baton Rouge	Transport of Surface-Modified Magnetic Nanoparticles in Subsurface Environmental Remediation	\$37,388	\$37,388	\$35,888	\$110,664	No
010B-11	KAM,SEUNG	Scientific	Louisiana State University And A&M College - Baton Rouge	New microscale thermal management technologies for high-performance, near lubricant-free, roller bearings	\$75,296	\$69,296	\$69,296	\$213,888	No
011B-11	Meng,Wen	Scientific	Louisiana State University And A&M College - Baton Rouge	Development of Architecture and Software for Complex Event Processing in Agricultural and Environmental Applications	\$80,000	\$78,000	\$0	\$158,000	No
012B-11	Mukhopadhyay,Supratik	Scientific	Louisiana State University And A&M College - Baton Rouge	Carbon Dioxide Flooding for Enhanced Oil Recovery and CO2 Sequestration	\$62,271	\$60,271	\$60,271	\$182,813	No
013B-11	Rao,Dandina	Scientific	Louisiana State University And A&M College - Baton Rouge	Development of machines and protocols for the manufacturing of novel microchannel heat exchangers for electronic cooling of next-generation computers	\$82,899	\$82,899	\$82,899	\$248,697	No
014B-11	Sinclair,Glenn	Scientific	Louisiana State University And A&M College - Baton Rouge	Unconventional Hydraulic Control for Deep-Aquifer Saltwater Intrusion Mitigation Under Uncertainty	\$80,000	\$79,000	\$0	\$159,000	No
015B-11	Tsai,Frank	Scientific	Louisiana State University And A&M College - Baton Rouge	Novel Nanomaterials for Medical Diagnostics	\$77,963	\$78,563	\$78,563	\$235,089	No
016B-11	Warner,Isiah	Scientific	Louisiana State University And A&M College - Baton Rouge	Wireless Network Identification and Intent Analysis: Burst and Suppression Based Radio Network Fingerprinting (RNF) over Public Safety Radio Band	\$89,000	\$90,000	\$99,525	\$278,525	No
017B-11	Wei,Shuangqing	Scientific	Louisiana State University And A&M College - Baton Rouge	Understanding the role of miRNA-27b in breast cancer	\$86,000	\$86,000	\$78,000	\$250,000	No
018B-11	Alahari,Suresh	Scientific	Louisiana State University Health Sciences Center - New Orleans		\$100,000	\$100,000	\$100,000	\$300,000	No

Proposal #	PI Name	Discipline	Institution	Project Title	Amount Requested				Confidential Info
					Year 1	Year 2	Year 3	Total	
019B-11	Dugas,Tammy	Scientific	Louisiana State University Health Sciences Center - Shreveport	Development of a novel drug eluting stent with improved efficacy, safety and biocompatibility	\$109,543	\$99,331	\$99,331	\$308,205	Yes
020B-11	Grozdzits,George	Scientific	Louisiana Tech University	Advanced Fiber and Particle Measurement and Characterization System for Emerging New Paper Product Industries	\$90,528	\$90,328	\$93,328	\$274,184	No
021B-11	Strimbu,Bogdan	Scientific	Louisiana Tech University	Assessment of forest planning sensitivity to product allocation using remote sensing data	\$99,908	\$99,708	\$86,708	\$286,324	No
022B-11	Wasiuddin,Nazimuddin	Scientific	Louisiana Tech University	Improving Temperature and Moisture Conditions of Aggregate on Asphaltic Surface Treatments: A Test Road Study	\$21,000	\$21,000	\$0	\$42,000	No
023B-11	Zhang,Ning	Scientific	McNeese State University	A Comprehensive Hydrodynamic and Sediment Study for Calcasieu Ship Channel and Surrounding Water Systems	\$91,830	\$91,830	\$0	\$183,660	No
024B-11	Zhang,Ning	Scientific	McNeese State University	Computational Fluid Dynamics for Hydro Turbine Design Optimization	\$38,526	\$42,654	\$0	\$81,180	No
025B-11	Ma,Junkun	Scientific	Southeastern Louisiana University	Evaluating and improving the efficiency of solar water heating systems based on flat plate, polyolefin tube, and evacuated tube solar collectors	\$83,933	\$66,933	\$0	\$150,866	No
026B-11	John,Vijay	Scientific	Tulane University	Novel Multifunctional Materials for the Environmental Remediation of Chlorinated Hydrocarbons	\$74,775	\$73,475	\$74,206	\$222,456	Yes
027B-11	Franklin,David	Scientific	Tulane University Health Sciences Center	Method for Genetic Detection Using Interspersed Genetic Elements.	\$119,126	\$99,079	\$99,591	\$317,796	No
028B-11	Dufreche,Stephen	Scientific	University of Louisiana at Lafayette	Production of Propylene Glycol via Biomass-Based Feedstocks using Hydrogen-Induced Catalysis	\$71,050	\$75,706	\$79,007	\$225,763	No
029B-11	Hayes,Donald	Scientific	University of Louisiana at Lafayette	Modular Sediment Retention and Shoreline Protection Structures	\$88,884	\$84,650	\$92,053	\$265,587	No
030B-11	Thomas,George	Scientific	University of Louisiana at Lafayette	Development of Software-Defined Radio (SDR) Technology for Satellite Communications	\$66,205	\$82,873	\$0	\$149,078	No
031B-11	Winters-Hilt,Stephen	Scientific	University of New Orleans	Highly specific SNP discrimination via nanopore transduction detection	\$79,899	\$79,224	\$78,481	\$237,604	No
032B-11	Winters-Hilt,Stephen	Scientific	University of New Orleans	Holographic HMMs and Stochastic Carrier Wave Communications	\$69,210	\$68,535	\$67,792	\$205,537	No
033B-11	Zhou,Weilie	Scientific	University of New Orleans	Fabrication of Supercapacitors through Three Dimensional Nanoarchitectures	\$54,095	\$52,868	\$51,796	\$158,759	No

Total Number of Proposals submitted	33
Total Funds Requested for First Year	\$2,503,433.00
Total Funds Requested	\$6,505,795.00